IN THIS ISSUE

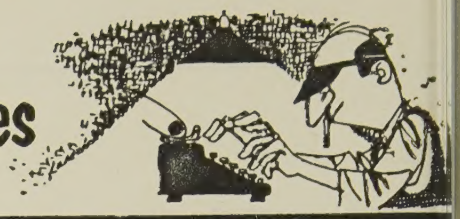
STEEL The Metalworking Weekly

December 9, 1957
Vol. 141 No. 24

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Subscriptions in the U. S. and possessions and Canada, $10 a year; all other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland.

Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

behind the scenes



Swinging & Swaging

Our barber was extraordinarily solicitous the other morning. "My cousin Giuseppi," he remarked, "she's alla time read STIL, and she's wanna know whatsa beeg story gonna come up Dec. 9. You worka for STIL, so maybe you tal me, hah?"

"Well, if Giuseppi really wants to know, tell her that . . ."

"Whatsa mat', you crazy? Giuseppi is not a 'her.' She's a 'him.' "

"A thousand pardons. Well, you can tip him off that STEEL has an interesting story this week about rotary swaging. Rotary swaging, you know, produces parts that can't be made any other way. Giuseppi will be delighted to learn that the machines are simple, easy to operate, and comparatively low in cost."

"Not so fast, pliz. Is 'swage' what I'm t'eenk it means?"

"Well, you take a tool with a given shape; lay it against an object, give it a rap with a hammer, and the object receives an impression. That's swaging. It's sort of like forging. Comes from a French word, 'suage.' "

"Ha! When I'm tich school I know 'swage' she's come from 'sudare,' which means you so hot you sweat, and she's no Franch."

Suddenly he drew himself up to his full 5 ft, and declaimed:

"What'sa mat', you don' know
What is meaning, dis 'swage'?
Is a Old Country word
Of a very great age.
She'sa meaning, I'm t'eenk,
You soon gonna perspire
When you swinga da ham'
On da forge by da fire.
You hitta da swage,
And you poosh 'em, you bet,
But da more-a you poosh,
Per Bacco, you sweat!"

It's a safe bet that Associate Editor Ross Whitehead had no idea of this involved but instructive etymology when he researched article No. 16 in the Production Ideas series ("Swagers Point, Form, Assemble," Page 157). Ross tells us that the outstanding feature of rotary swaging is the wide variety of jobs it can handle. Future applications, it seems, will include an increased amount of joining and assembl work.

Yum Yum Dept.

The cast of characters in this ite includes STEEL's Georgia boy, Fr Allen, who represents your favori business paper in the old Confe eracy; Assistant Editors Mary Ali Early and Mary Borgerhoff, Shrdl and the young lady who handl STEEL's reprints, June Schilens. W had just opened the morning ma and were gazing pop-eyed at a sm box of chocolates that had come a the way from Griffin, Ga., courte of Fred Allen.

"Hmmm, chocolates!" murmur Mary Alice, pausing in her passag to the Art Dept.

"And nicely wrapped, too!" ex claimed Mrs. Borgerhoff.

"They do look yummy," sigh June, eying them with the air of on who is about to cast calorie counts t the winds.

"They're from Fred Allen," we ex plained. "Isn't that decent of him Help yourselves, girls. He write 'Re: Roasted caterpillars in yo Nov. 18th column: Try these for siz Ugh! Fred.' "

The ladies froze like setters, the dropped the chocolates and fled. Th confections were boldly l a b e l e "Chocolate Covered Ants."

Naturally, we carried them a over the building, stirring up splen did reactions. Louise Kirkpatrick c the Press Div., however, remarke that she was still in a state of shoc over the sight of some goodies sh had seen the day before: Canne baby sparrows.

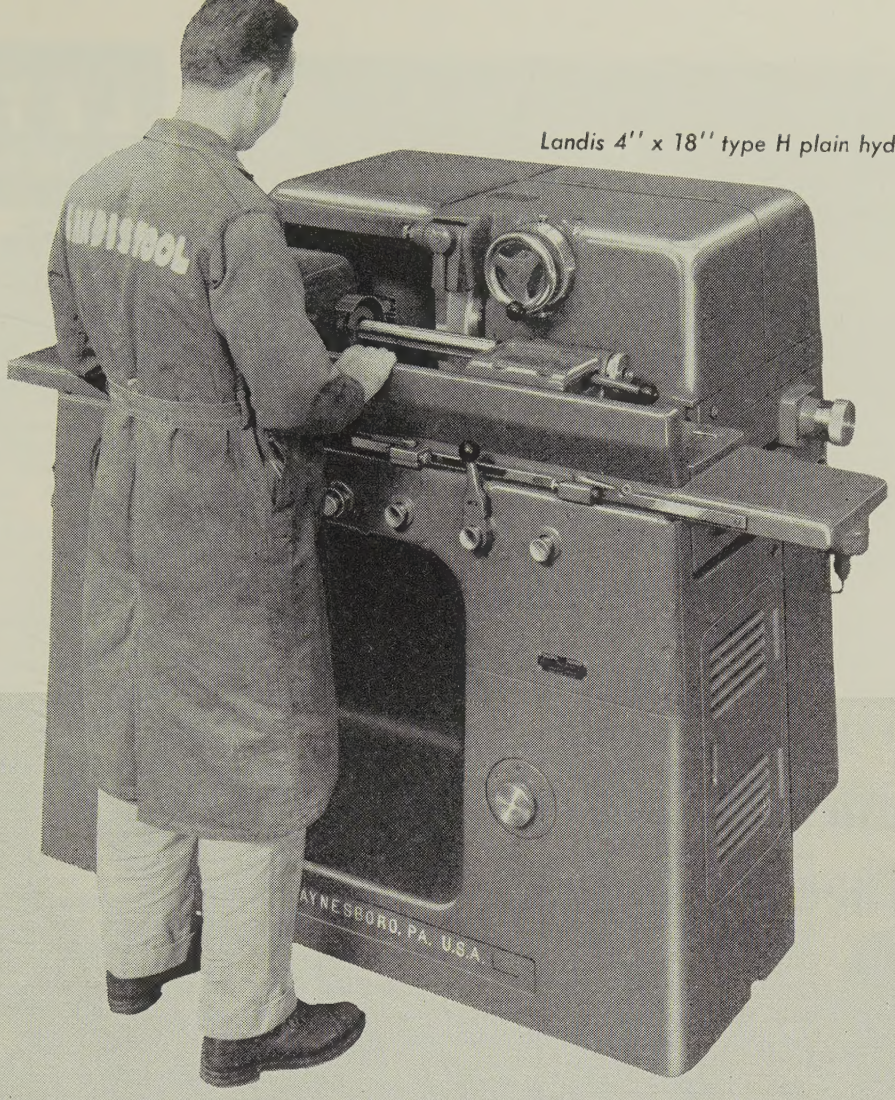
Well, here it is noon already. W think we'll stay in and just read fo a spell.

Crazy Measures, Man

If a gleeper is as long as tw plonths and a half gleeper, and blahmie is as long as two gleeper and a half blahmie, and a pooster i as long as two blahmies and a hal pooster, then how many plonths lon is a half pooster?

Shrdlu

(Metalworking Outlook—Page 107)

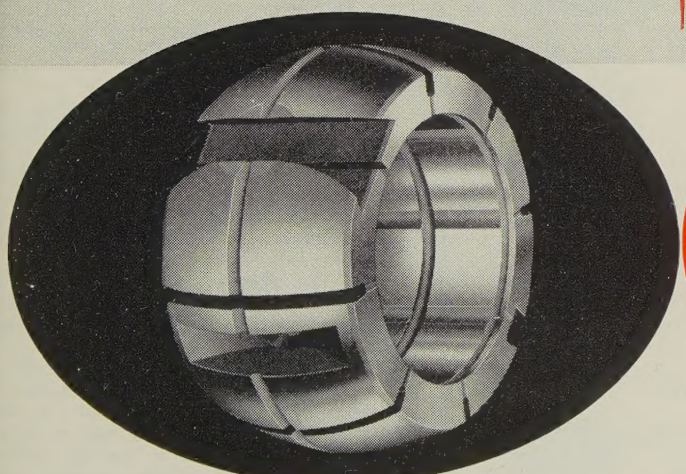


Landis 4'' x 18'' type H plain hydraulic grinder

Production and precision of 4'' Landis hydraulic grinder give lower cost per unit

condensed specifications

Nominal work swing	4''
Length between centers	18''
Diameter grinding wheel	16''
Wheel drive motor	3 hp.
Work speed range (rpm)	200-900
Net weight	4400 lbs.



Exclusive Landis Microsphere wheel spindle bearings . . . with closest running clearance of any spindle bearings, for added precision and shorter spark-out time.

LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

LETTERS TO THE EDITORS

No Shortage of Engineers

STEEL is one of the finest publicati today, and I have been particularly terested in your editorials and artic on management and operations. Ho ever, I would like to comment on y editorial, "Shattered Complacency" (C 14, Page 63).

You wrote that a possible solut to the relative position of Russia a the U. S. would be the development an adequate reservoir of scientists a engineers.

A large number of scientists and gineers in the military industry, incl ing myself, are alarmed by the cries the "shortage of engineers" and "p duce more scientists." We maintain th such is not the case. A poll among colleagues would reveal:

1. Given the opportunity, many wo probably choose jobs in the comm cial field.
2. There is a feeling of insecurity.
3. Many would not recommend s ence as a career.
4. There is a "waste" in the use engineers and scientists.

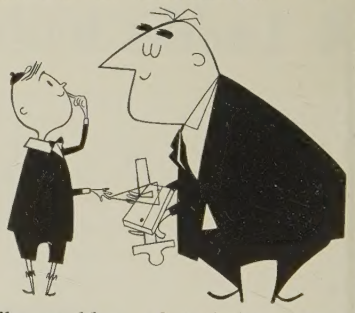
Facts—such as the recent and ce tinuing layoffs of scientists and en neers because of contract cancellati and money shortages—indicate the no shortage of scientific people.

In the long range, more engineers w be needed. But before this can be do a scientific career must be made m acceptable and stable.

I hope some of the "unknown" s of the problem has been conveyed.

Richard J. Lo
442 E. Michell
West Covina, Ca

Freedom of Education

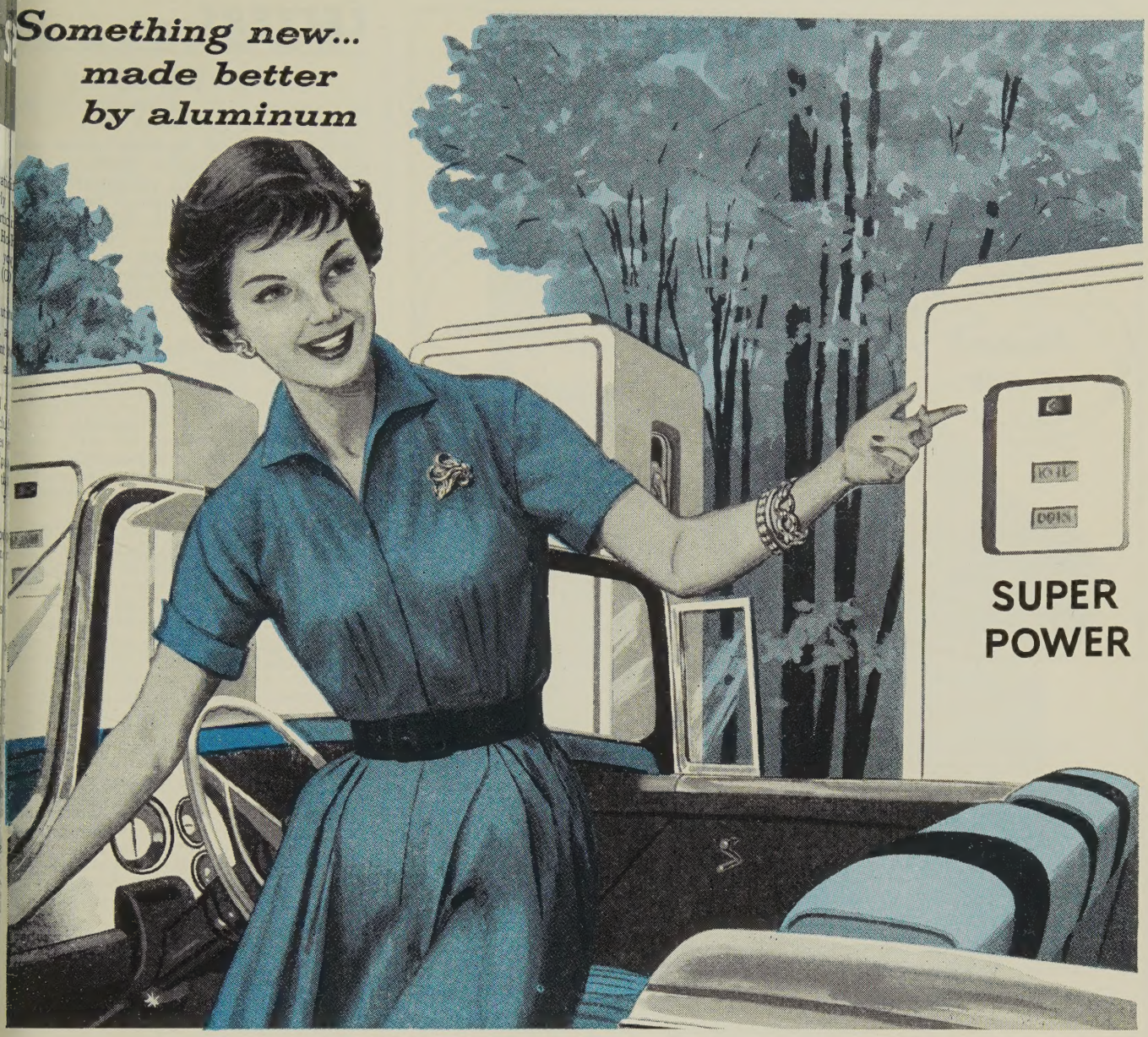


The problem of technical educati has been discussed many times. Y have an article, "Needed: Better Tra ing" (Nov. 18, Page 114).

After the Russian sputniks w launched, we noticed that something wrong with our education. Many a ticles state that the Russian techni education is excellent, but "we do n want such a thing. We want freed of education." Such thinking makes t fundamental mistakes:

1. The present Russian technical e ucation is based on the same princip that czarist Russia and most Europe countries used 60 years ago.
2. Freedom of education should n be understood as the free choice b tween education and baseball. In cza ist Russia, high schools had a defini program of education for all childre and freedom of education was und

(Please turn to Page 12)



Super-purity aluminum has helped set a new standard in gasoline performance . . . new standards in metal brilliance and workability.

From high-power gasoline to high-fashion jewelry . . . super-purity Aluminum is making news

The new third pump in filling stations across the continent is one more symbol of aluminum's amazing versatility. For these higher octane gasolines are produced by a new catalyst—made possible by super-purity (99.99+%) aluminum. And Canada's Aluminium Limited, alone, supplies two thirds of this super-purity metal used by the North American oil refining industry.

In Metalworking too

Super-purity aluminum is also being used more and more in quality metalworking. For no other metal of such easy workability can be polished to such a brilliant and long-lasting lustre. This unique combination of properties has proven invaluable to makers of reflectors, jewelry, tableware, and decorative trim for higher priced automobiles and modern buildings.

Canada a logical source

To produce super-purity aluminum requires twice as much electric power as the commercial grade. That's why Aluminium Limited with its vast hydroelectric installations in Quebec and British Columbia is such a logical source. Once again this independent Canadian producer's natural role as a supplier of primary aluminum is serving the skills of American fabricators to create new products made better by aluminum.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • BUENOS AIRES • SÃO PAULO

LETTERS

(Concluded from Page 10)

stood as the right of everyone to g or not to go, to high school.

Pupils with no capacity for a re high school were able to study in pr fessional schools, being on different lev els and designed for different capacitie

Freedom of education did exist an does exist, even in Russia. But we mu understand this fact: Kids are not ab to decide at 10 or 11 what they wan to study at 18 or 19. So they stud basic subjects in high school and the are able to decide.

If so many articles are devoted Russian education, it is not becaus Communism has created an exclusiv educational system and not becaus Russian education is compulsory. It because the normal European style (an old Russian) is the only reasonable an only efficient educational system. means dealing with difficult subject and hard work.

Our educational system has bee based on the unsound principle that, a the start, kids decide what they wan and 90, if not 99, times out of 100, th decision is the "easiest" way.

It seems to me that the problem mu be discussed and rediscussed and ke alive. Straightening up of our technic education would be a painful proces but it means "to be . . . or not to be.

John Obrebsk
Chief Metallurgis
Monarch Machine Tool C
Sidney, Ohi

Photoetching for Profit

Please send a copy of the interestin and informative article, "Photoetchin Forms Thin Parts" (Nov. 18, Page 153) No. 15 in your Production Ideas serie My employer, Decorative Media Inc is doing the same type work—but fo decorative purposes.

William Schumache
270 W. Madison Ave
Youngstow

Wants More on Pretesting

Your article, "Pretesting Ups You Odds" (Nov. 11, Page 70), covers a important subject. I would appreciat a copy.

While material presented in this ar ticle is interesting, it is on the brie side in some areas. Can we look fo more information on this subject?

Keith B. Kittl
Director of Research & Developmen
Atwood Vacuum Machine C
Rockford, Il

• *Yes.*

Selector Helps Company

Kindly send me the 1957 Metal Se lector offered in the Oct. 28 issue. feel it will be helpful to us.

G. E. Jaquillar
C. E. Saunders Associate
Detro

Built-In Encouragement

May we have five additional copie of your Program for Management ar ticle, "Small Business: Its Place in Ou Future" (Nov. 11, Page 99). The prac tical encouragement built into this ar ticle will, I know, help our men in serv ice and sales work.

Keep up the good work!

Bill Payn
Sales Manage
Dayton Tech Art Co
Dayton, Ohi

CALENDAR
OF MEETINGS

Dec. 10-11, Society of the Plastics Industry Inc.: Conference on vinyl products in the consumer field, Hotel Commodore, New York. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Dec. 11-12, National Construction Industries Conference: Hotel Sherman, Chicago. Sponsor: Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

1958

Jan. 6-8, Southern Industrial Distributors' Association: Midyear meeting, Roosevelt Hotel. New Orleans. Association's address: 1626 Fulton National Bank Bldg., Atlanta 3, Ga. Secretary: E. L. Pugh.

Jan. 13-17, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler Hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 16-17, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 17, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Jan. 19-22, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc, Fontainebleau, and Deauville Hotels, Miami Beach, Fla. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

Jan. 20-22, Truck Trailer Manufacturers Association: Annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 20-23, American Road Builders Association: Annual meeting, Sheraton-Park Hotel, Washington. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: Louis W. Prentiss.

Jan. 21-22, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

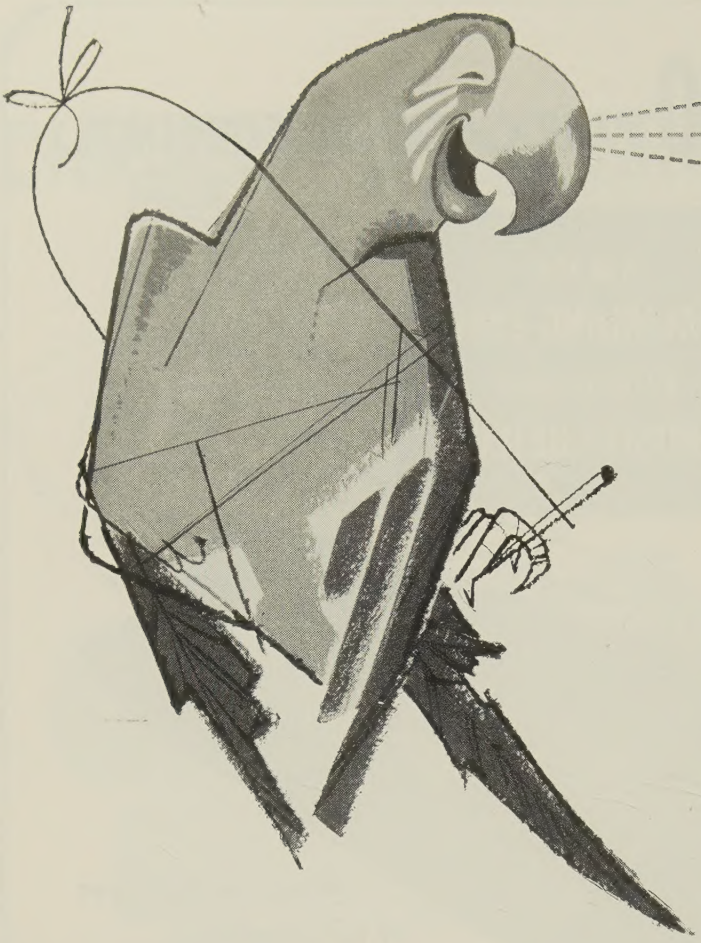
Jan. 26-Feb. 2, Association of Steel Distributors Inc.: Convention, Algiers Hotel, Miami Beach, Fla. Association's address: 29 Broadway, New York 6, N. Y. General counsel: Morris Rosoff.

Jan. 27-28, Industrial Heating Equipment Association: Annual meeting, Penn Sheraton Hotel, Pittsburgh. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 27-30, Plant Maintenance & Engineering Show and Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 30-31, Steel Plate Fabricators Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 105 W. Madison St., Chicago 2, Ill. Secretary: J. Dwight Evans.

Feb. 3-7, American Institute of Electrical Engineers: Winter general meeting, Statler and Sheraton-McAlpin Hotels, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.



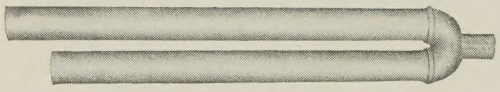
THERMALLOY*

...THE RIGHT WORD FOR LONG-LIFE ECONOMY IN HEAT-RESISTANT CASTINGS

First cost is only one factor in the operating economy of high-heat-resistant castings. Extra service life, obtained through the *right* combination of physical properties and casting techniques, is a much sounder gauge of over-all economy.

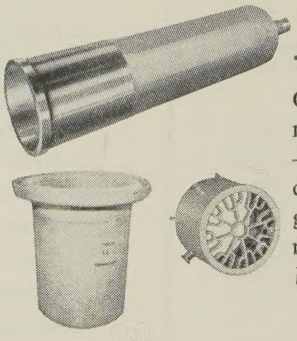
That's why more and more heat-treat operators are specifying Thermalloy Radiant Tubes, Retorts, Trays, Pots and other heat-treat parts. We'd be glad to show you service life case histories to *prove* their long-life economy. Contact Natural Gas Equipment Co. Or write for the technical bulletins listed below. Electro-Alloys Division, 80412 Taylor Street, Elyria, O.

*Reg. U. S. Pat. Off.



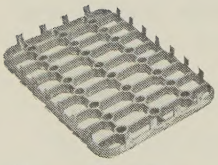
Thermalloy Radiant Tubes

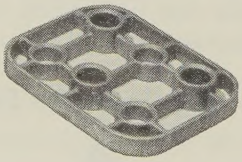
Centrifugally cast to insure uniform wall thickness; pressure tested to assure freedom from leakage; X-ray controlled to guarantee soundness. *Write for Centrifugal Casting Bulletin T-283.*



Thermalloy Retorts

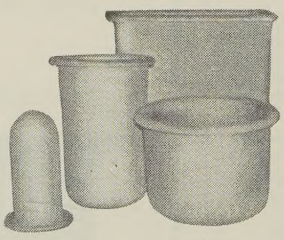
Octagonal, pit-type, annealing and spiral retorts —plus baskets and spiders. Special designs and grades of Thermalloy to meet your specifications. *Write for Bulletin T-239.*





Thermalloy Trays

Experienced design know-how and casting techniques, plus Thermalloy's outstanding physical properties, mean extra service life and economy. *Write for Bulletin T-227.*



Thermalloy Heat-Treat Pots

A wide range of standard sizes, or "specials" to meet your needs— all cast of long-lasting Thermalloy heat-resistant alloys. X-ray inspected, pressure tested. *Write for Bulletin T-234.*

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION Elyria, Ohio

Represented by: NATURAL GAS EQUIPMENT CO., 804 S. Fair Oaks Ave., Pasadena 2, Calif. Tel. RY 1-9621
Visit Booth 236, Western Metal Exposition

STEEL

December 9, 1957

Metalworking Outlook

Steel Estimates for 1958

Estimates of steel ingot production for 1958 range from 108 million to 115 million tons. Some 114 million tons will be turned out in 1957, compared with 115 million in 1956 and 117 million in 1955, the all-time record. If output next year falls in the middle of the range now estimated, it will be only about 5 per cent below the 1955 high.

Budget Deficit Coming?

President Eisenhower will probably send a $73 billion budget to Congress in January, topping fiscal 1958's total by about $1 billion. The hooker: The budget will call for about $1.5 billion more than last year's for direct defense expenditures, plus a boost of about $500 million for the Atomic Energy Commission, along with at least $4 billion for military and economic foreign aid. At least $1 billion (maybe $2 billion) must be cut from the civil side of the budget. Congress won't stand for that in an election year because such cuts would have to come in three vote-getting areas: Farm aid, veterans' benefits, and public works. The outlook: Congress could hand back to Ike a budget of $75 billion, with a corresponding deficit of $2 billion.

Wage Freeze Plan Dies

The proposed wage freeze for next year in the building trades was quickly killed last week by AFL-CIO President George Meany. Richard Gray, president of the federation's Building & Construction Trades Department, is in the doghouse for even having mentioned the idea. Labor's party line on wages for 1958 will be: "Higher pay is needed to bolster the economy." Metalworking scales may go up an average of 8 cents next year.

Pay Hikes in Recessions

Even in periods of business declines (which we'll be experiencing for the next nine months) there are plenty of precedents for wage increases. In the 1949 recession, average hourly earnings for manufacturing workers climbed 5 cents from 1948. In the 1953-54 dip, pay rose an average 4 cents an hour between the two years. Metalworking scales traditionally rise more than the general manufacturing average.

Four Reforms in Labor

Labor Secretary James P. Mitchell lists four major recommendations that he believes will be made by the administration as a result of the McClellan Committee hearings. Proposed would be laws requiring: 1. Full disclosure of health and welfare fund operations. 2. Secret election for union officers at least every four years on pain of losing National Labor Relations Board services. 3. A ban on "blackmail" picketing where a union puts pres-

Technical Outlook—Page 155

Market Outlook—Page 233

sure on an employer to sign up workers against the will of the employees. 4. Jail sentences for professional labor tough guys.

8-Million Car Year by 1965

"By 1965 the automotive industry will be averaging 8 million cars and 1.4 million commercial vehicles a year," predicts L. S. Hamaker, general sales manager for Republic Steel Corp. His reasoning is based on the expectation that 5 million more people will be in the important 18 to 24 age group by that time, that 7 million more households will exist in the country, that 11 million more families will have annual incomes over $5000, and that 11 million two-car owners will be in the market, twice as many as today.

Program for Scrap

The Institute of Scrap Iron & Steel offers this program to assist dealers: 1. Get scrap rated as solid loan collateral. 2. Standardize scrap preparation so grade specifications are the best possible. 3. Get steel mills to forecast scrap consumption. 4. Seek government loans on scrap. (The Small Business Administration has been approached by the institute on the fourth point.) The institute says that employment in the scrap industry had declined about 25 per cent since last Jan. 1 because of low demand for the material.

Christmas in Industry

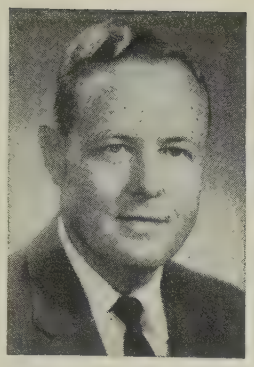
Some 84 per cent of 157 firms surveyed by the National Industrial Conference Board plan to give Christmas bonuses this year. The same firms gave them in 1956. Christmas gifts are another matter. Most companies disapprove of the practice, both giving and receiving. But most of them also have trouble stopping the custom or keeping it within the realm of propriety.

Toys Sell Well

Toys will be selling at the rate of $50 million per shopping day from now until Christmas. Toy Manufacturers of the U.S.A. estimates volume this year at $1.5 billion, compared with $1.3 billion last year. Some 65 per cent of the total is retailed between Thanksgiving and Christmas. At the rate toys are moving now, inventories at the start of 1958 should be low, and next year's volume should also be high.

Straws in the Wind

The new Institute of Sanitation Management says America's annual bill for building sanitation and maintenance is $4 billion . . . Copperweld Steel Co. and Superior Steel Corp. consummated their merger on Nov. 30 . . . Some 120,000 Westinghouse Electric Corp. workers have received $2.5 million in cost-of-living increases.



How To Clean Up the Labor Mess

In their meeting at Atlantic City last week, the 109 unions brought into one big family through the marriage of the AFL and CIO could have taken time out on Dec. 5 to celebrate their second anniversary of wedded bliss.

But it has been two years of corruption, violence, gangsterism, monopoly power, and internal jurisdictional strife. There has been no wedded bliss, not even a honeymoon. The marriage has turned out to be a mess. There was no reason for celebrating.

Take the matter of jurisdictional strife. Bickering among craft unions over who should do the work has resulted in costly delays for industrial giants like U. S. Steel.

Smaller companies are also being squeezed between the jaws of the union nutcracker. For example: Burt Mfg. Co., which has a steelworkers' union, finds that the sheet metal workers' union will not install ventilators it makes. The sheet metal union insists that the ventilators should be made in contractors' shops by more expensive hand methods.

Or take Osco Steel Co. It operates union warehouses in Michigan and Ohio. The Teamsters' union is using sledge-hammer tactics to force Osco's workers to switch unions. For relief in Michigan, the dispute must be heard before judges who were financially supported at election time by the Teamsters' James R. Hoffa, according to charges of the McClellan Committee.

Continuing jurisdictional disputes alone are ample evidence that the AFL-CIO has no intention or desire to clean up its own mess.

Badly needed in the next session of Congress is legislation that will assure greater control of unions by union members. They must be run from the bottom up as in a democracy, not from the top down as in a dictatorship.

Business management must take a stiffer stand in dealing with unjust demands of irresponsible union leadership.

The victims are not only employers but also the union members who are honest, law-abiding citizens.

Irwin H. Such

EDITOR-IN-CHIEF

and now it's....

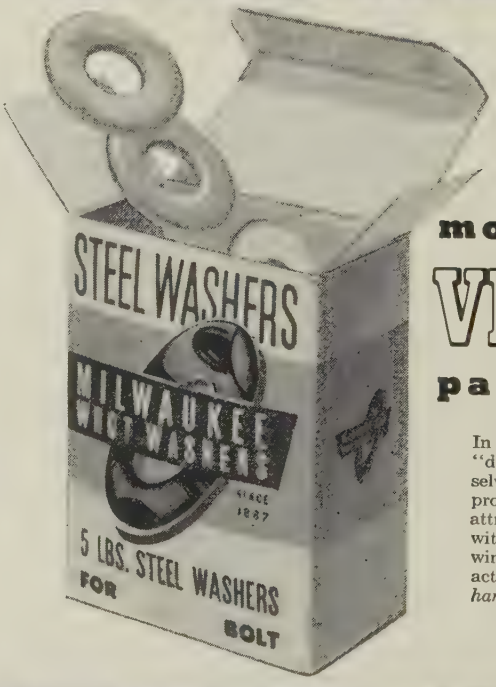
WASHED WASHERS

● Whether *dispensing* or *using* washers . . . there's great personal satisfaction in handling clean washers that don't mess up your hands nor soil the "work".

Yes, *washed washers* are the latest practical innovation introduced by Wrought Washer Mfg. Company, applying to all popular sizes of U. S. Standard and SAE Washers, including also Rivet Burrs and Machinery Bushings. All grease, graphite, oil and other foreign matter is removed by our special washing process. This is a new *plus value* over and above the consistent high quality which is an inherent part of all Milwaukee Wrot Washers . . . *at no increase in price!*

No matter what your washer requirements may be . . . every type, size, material and finish . . . look to Wrot Washer as your No. 1 source. Write for Catalog No. 40.

DEALERS: Order from your regular jobber . . . 1-lb. and 5-lb. packages, put up in 200 lb. shipping cartons.



plus...

modern

VISIBLE

packaging

In keeping with a policy "dressing up" the washers ther selves, by our special washi process, they are now put up attractive 1-lb. and 5-lb. packag with a tough, transparent Myl window which makes visible t actual washers . . . *clean handle, better to use.*

A7-9090-1P

WROUGHT WASHER MFG. CO.

THE WORLD'S LARGEST PRODUCER OF WASHERS

2103 SOUTH BAY STREET • MILWAUKEE 7, WISCONSIN

What Kefauver May Find at Auto Price Probe

(Cost breakdown of typical car in Chevrolet-Ford-Plymouth range)

Total material	$ 800
Vender purchase	500
Inside transfer	300
Productive labor	125
Burden (including nonproductive labor)	275
Total (plant level cost)	1,200
3% variance	36
Inbound freight	35
Outbound freight	50
Tooling & engineering	50
Sales & advertising	50
Administrative, commercial & miscellaneous expenses	90
Profit	255
Total dealer price	1,766
Distribution and delivery (average)	70
Excise, handling	175
Dealer markup (31.6% of dealer price or 24% of retail)	558
Dealer handling	50
Local tax and license	80
Driveaway price	$2,699

Auto Price Probe: A Draw?

Whether you believe that autos are priced too high depends upon which set of figures you examine—the UAW's or the automakers'. The two sides will argue this way

BARRING sudden changes, the Congressional probe into auto pricing policies will get underway Dec. 17. The contest will probably wind up as a draw.

Sen. Estes Kefauver (D., Tenn.), chairman of the Senate's Anti-trust & Monopoly Subcommittee, is party bound to support UAW President Walter Reuther's claim that excessively high profits are the reason for today's high car prices.

Sen. Everett Dirksen (R., Ill.), spokesman for the Republican half of the committee, is equally determined to show high labor and material costs are the prime factor behind the boost in auto prices.

Take Your Pick — Automakers and Mr. Reuther will appear in Washington on separate days with clusters of facts and figures to support their contentions.

If the committee digs deep enough, it may discover how auto costs are figured and just what percentages of these costs go for materials, labor, and profits. Such information might bring the senators a step closer to finding out why the union wants to cut prices and why car builders feel present profit levels are not unreasonable.

STEEL's table (above) shows the corporate cost breakdown of a low-priced automobile. The figures are based on a 1955 model and include typical accessories like radio and heater, but the relative percentages hold true within a few points for 1958 cars. Higher priced cars tend to charge off more per unit for engineering, tooling, and administration.

Car Cost Breakdown

In figuring prices, each division starts with a wholesale price based on previous models, plus what it figures competition will be charging. Prices usually are figured to include accessories normally sold on the car. Designers and accountants charge off each item of expense against this price to come up with a cost per car.

The result should be enough profit per car at standard volume to satisfy demands previously levied against the division by its corporate head. If not, the accountants start looking for places to cut. An Edsel costman says salaried personnel are the first to go.

No Snap — Making costs come out is a tough job because prices have to be figured three years

ahead so contracts can be let. Industry cost teams can only roughly anticipate what extra increases will be caused by labor and material changes.

If they're wrong, the division has to hope accessory sales (which have higher profit margins) or over-standard production volume will make up the difference.

Based on Standard Volume

The heart of the pricing system, and real key to the profits Mr. Reuther complains about, is the standard volume theory developed by former General Motors Corp. executives, Donaldson Brown and Albert Bradley, almost 20 years ago.

Standard volume is a percentage of capacity. It represents the number of vehicles that must be produced to pay all costs, plus a predetermined return on investment. GM, for example, traditionally aims at a 20 per cent return.

Divisions Differ—There's a different standard volume for each car series, and each division calculates what standard volumes are apt to bring the best return at a given wholesale price.

Theoretically, if a car won't pay a decent profit on standard volume, the division will scrap it. That's supposedly the reason Ford dropped its Customline this year.

The capacity on which standard volume is figured includes an overflow, so car builders will be sure of having enough facilities to handle peak production years like 1955.

Won't Talk — Automakers have never revealed standard volumes although they do say they haven't changed significantly for some years.

Union sources believe standard volume for the industry is roughly 30 per cent of present total capacity. Total capacity, the same sources claim, is between 10 million and 12 million units annually, depending on the amount of overtime work included. But there are signs that standard volume is being revised upward.

Little Difference — In any case, when a division produces and sells over the standard, profits increase tremendously. All divisional costs on subsequent cars, except direct labor and materials, have been paid for under the standard volume plan.

Above-standard profits don't influence car prices one way or another, but they are the means by which auto firms have piled up returns that have run well over 20 per cent in recent years.

Makes for High Profits

Are those profits too high? Mr. Reuther thinks so. Just looking at GM, he claims that firm will have increased profits (before taxes) an estimated 259.9 per cent from 1947 through 1957. (The '57 figures apparently are projected from first-half statements.)

From 1947 through 1956, Mr. Reuther figures GM's net worth increased 220.6 per cent. Only 13 per cent of the increase ($396 million) has come from the sale of new stock. "The balance comes from excessively high profits which resulted from exorbitant prices exacted from consumers," he snaps.

Rebuttal — Automakers think a more reasonable comparison is to size up profits against investments each year. On that basis, GM's percentage of profit on net shareholder investment (before taxes) was 34.9 per cent in 1947. In 1955, when all car builders went way over standard volume, GM earned a 59 per cent profit on shareholders' investments. Last year, the figure dropped back to 36.9 per cent. Ford and Chrysler also show profits over the 20 per cent mark for most recent years.

Car Builders Seek To Expand

If Senator Kefauver's committee ever gets this far, the automakers probably will point out that progressive profits over standard volume don't contribute to the car price. But labor rates (up 68 per cent in 11 years for automakers) are a factor. So are material increases. Materials make up 67 per cent of a car's price. Profit, they'll say, is a steady 21 per cent on standard volume.

Next, the industry will probably tell the senators the high profits are needed because car building has more financial risk than, say, steelmaking. Besides, the profits are needed to finance plant a equipment for the 10-million-c years ahead.

Countermove — Mr. Reuther apt to claim that new plants shou increase productivity. He thin profits resulting from such i creases should be split among t carmaker, the workers, and t consumers (in the form of low prices).

The auto companies could tu to data adapted from Bureau Labor Statistics figures to sho that prices rise when wages ou run productivity (see STEEL, Se 30, p. 45).

True Motives?—All the talk productivity and profits rea is hiding another side of the pro lem, say some Detroiters.

The auto companies want to e pand for 10-million-car years, b they also foresee a guarante annual wage which means wor ers will get paid whether the work or not. The industry wan to use these profits to build plan so it can pull in more parts wo and insure steady work for i regular employees.

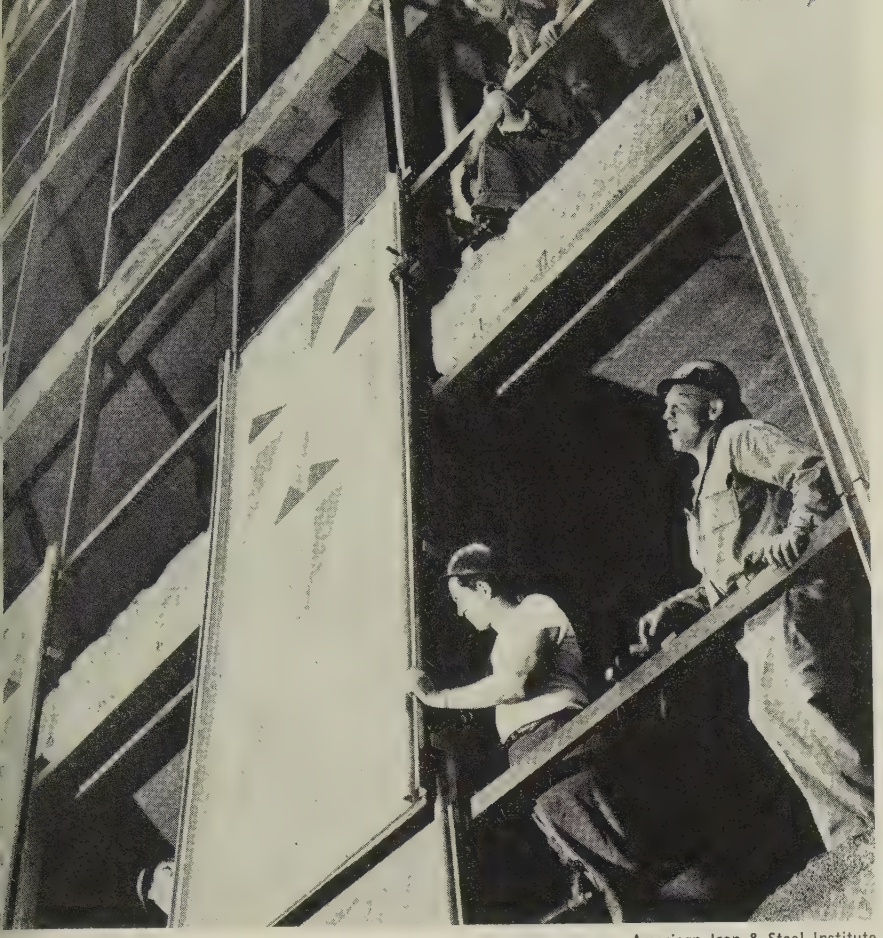
Another point: Every time a auto firm decentralizes, it tends t weaken the union's strength. Fa flug locals can't run to Detro UAW headquarters for help wit daily problems.

While such motives alone woul not influence the industry and th union to take the stands they d they contribute to the respectiv positions, observers believe.

Air Reduction Opens Plant

Air Reduction Sales Co., a di vision of Air Reduction Co. Inc has moved into its $400,000 plan at Arlington, Tex. It will produc high purity oxygen and nitroge and will also be used as a ware house for acetylene, argon, calciu carbide, welding supplies and equip ment.

Another Air Reduction division Ohio Chemical & Surgical Equip ment Co., will have offices an warehouses there. Facilities form erly at Dallas have been move to Arlington. Harry Melick, wh was in charge of the Dallas plant will be superintendent of the ne facility.



American Iron & Steel Institute.

Workmen attach one of the 7000 stainless steel panels used on the 42-story Socony Mobil Bldg. in New York

Curtain Walls Catch On

After a slow start, metal curtain wall construction is rapidly gaining popularity. With big hurdles crossed, industry now tackles design problems

SALES of metal curtain walls may hit $100 million in 1957—600 per cent above the 1950 figure, says Kawneer Co., Niles, Mich. The firm predicts annual industry sales of $325 million by 1965. Ingram-Richardson Mfg. Co., Beaver Falls, Pa., has tripled its production since 1955.

Over 40 companies now furnish curtain wall materials, but many are primarily concerned with panels or windows only. A few companies engineer, fabricate, and install complete systems.

Helpful Trend — Curtain walls got their start in huge office buildings. Now the concept is being extended to small structures, the development that wall fabricators have wanted.

Prohibitive building codes blocked the acceptance of curtain walls for a long time. Recent revisions permit the use of insulated lightweight panels when the wall is 30 ft or more away from an adjacent structure. The revisions have been adopted by the Building Officials Conference of America, Southern Building Code Congress, National Board of Fire Underwriters, International Conference of Building Officials, four states, and numerous major cities.

Cost—The average wall cost for six new metal-faced buildings in New York was $9.47 per square foot (including the metal, glass, back-up wall, interior finish, overhead, profit, installation, and even a prorated allowance for air conditioning). Curtain walls effect indirect savings which lessen the apparent cost. Examples:

- Because the wall weighs less, you save on structural steel, foundation, and footings.
- Because it takes substantially less construction time, you get earlier occupancy and save on labor costs.
- Because of thinner walls, you get more floor space. (U. S. Steel Corp. reports that 1450 sq ft was gained at the Puget Sound Power & Light Co. building in Bellevue, Wash.)

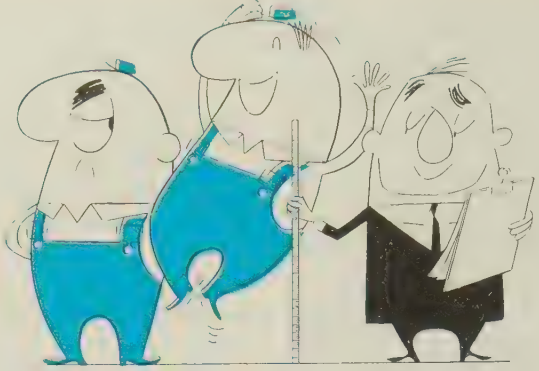
Good Potential — The exterior, nonload bearing walls have a long way to go before they saturate their market. Informed industry sources claim a potential of 500,000 tons annually. Less than 10 per cent of that is now realized.

Jack M. Roehm, Kawneer's director of research, sees developments emerging which will give the industry an added boost. They include: 1. A finished inside-outside wall package. 2. Radiant heating panels. 3. Factory-fabricated walls that include plumbing and electrical conduits. 4. A wide variety of forms and colors. 5. Solar screening elements enclosed in the panel. (Automatic control will maintain ideal sun shielding conditions throughout the day.)

Squaring Off—Now industry is tackling the problem of designing metal curtain walls to achieve long life, aesthetic appeal, and more rapid construction. One major problem is in designing the panels so that any one can be removed without disturbing surrounding panels.

The American Iron & Steel Institute sponsored a series of studies by Princeton's School of Architecture aimed at solving these problems. The researchers reported:

- Metal walls lend themselves better to sealing than do masonry walls because they have fewer joints; joints can be formed to trap water or to hold and protect a sealant.
- Shading panels can reduce air conditioning costs as much as 83 per cent. An expenditure of $23 per square foot for auxiliary sunshade devices can be justified in savings over a 20-year period.



How Do Your Employees Feel . . .

- About their jobs and working conditions?
- About their wages, benefits, incentive plans?
- About their co-workers?
- About their supervisors, your management effectiveness?
- About your company as a place to work and grow?

Give Employees Their Say

An attitude survey is a device you can use to learn what's wrong (and right) with your operation. It can help pinpoint industrial relations problems and lead you to solutions

AN ATTITUDE SURVEY at Bell & Howell Co. revealed an unusual source of irritation: One group of men disliked the name of their department (Salvage) because of its connotation.

These men (many are highly skilled) disassemble components rejected through quality control checks to recover re-usable materials and parts. At the suggestion of one man in the group, the name was changed to the Materials Review Dept.

Realm—Problems pointed up by an attitude survey of your employees won't all be that easily corrected. In many cases, the problems won't be so easy to identify either. But such surveys can be a useful tool in measuring employee attitudes toward:

1. Their job and working conditions. 2. Economic rewards. 3. Relations with co-workers. 4. Administrative effectiveness, from supervisor to top management. 5. Your company as a place to work.

Reason — Why the growing interest in attitude surveys? Many thoughful executives feel that today's industrial relations is too often founded on a "by guess and by gosh" basis. Too many well-intended programs fail becau the problem isn't correctly ident fied. Properly conducted and a alyzed, an attitude survey can as valuable in directing your in dustrial relations program as co sumer research is to a sales cam paign.

Signs which indicate an attitud survey might prove valuable you include: Excessive grievance high turnover, increase in scra rate, a drop in product quality, e cessive tardiness, minor inciden among workers, and a decrease i productivity.

H. M. Harper Co. and Bell Howell, both of Chicago, decide to conduct surveys because ea felt a need to "get a closer che on the pulse" of employees. Eac used the program developed b University of Chicago's Industria Relations Center.

Coverage — This survey is de signed for all employees. Att tudes are expressed on these fac tors: Job demands, working con ditions, pay, employee benefits, re lations with fellow employees, re lations with supervisors, relation with management, effectiveness o management, communications, se curity, status and recognition identification with the company opportunities.

Questionnaires are usually fille out on company time. (It take about 30 minutes.) Employees an swer questions—78 in the U of C program—by indicating whethe they agree, disagree, or are unde cided. At the end of the form i space for comments. Complet anonymity is maintained.

In the Chicago program, say Willard Erickson, director of th attitude survey project at U of C supervisors and certain member of management are asked to esti mate how the attitude scores o their employees will rank wit those of the average industria population. Areas most likely t be overestimated: Communica tions, effectiveness of management opportunities in the company.

Contents—The U of C Industria Relations Center provides firms with two reports: 1. An analysis of how employees feel in the ma jor areas of personnel relations job conditions, pay, supervision and management. 2. Employee group scores and how they rank

ith the average profile of more han 300,000 who have been surveyed.

Promise — Follow-up, stresses Ir. Erickson, is important. Once ou've decided to conduct a survey ou're in effect pledging to the mployee that you'll: 1. Let him now the results. 2. Improve areas vhich the survey indicates are veak.

Report—Some companies rely on written summary of the results n a special pamphlet or employee ublication. Mr. Erickson recommends a feedback program in vhich the supervisor gets together vith his subordinates and discusses heir group attitude scores. Emphasis is on getting employees to talk about the results and make suggestions to improve areas hey've indicated are weak.

Results—There are side benefits in such a practice. One firm reported that one of its foremen had been rated low by his subordinates. It was a blow to his pride to be classed as a stern, strict foreman of the old school.

But he made the report, then admitted his shortcomings and asked his men for suggestions. Officials reported an immediate improvement in morale—"partially due to the foreman's attempt to be a better boss, but probably due more to the respect he gained by asking for help."

Bell & Howell conducted about 120 meetings in which foremen reported group results. Over 3000 suggestions—better than one per employee—came from them. A steering committee sifted them. Those with merit were assigned to individuals who were responsible for reporting any action taken. At right is a partial list.

Examples — Harper Company was surprised, says Philip Craig, personnel director, to learn that certain office employees were dissatisfied with some of their equipment. A check revealed the criticism had merit, and new office machines were purchased.

Another area of employee concern at Harper was that personnel practices and policy were not clearcut. The first step to be taken —in addition to trying to improve communications generally—will be to put out a supervisor's manual which spells out personnel policy.

The cost of attitude surveys is not prohibitive, even for the small company—the average is about $3 per employee.

How often should you repeat the surveys? There's no stock answer. It depends upon how big a change has taken place in your company.

One executive sums up attitude surveys this way: "We talk to our employees in industry as being members of the team. Why not give them a chance to express their feelings and make better players of them?"

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Unfair Labor Charges Rise

For the third consecutive quarter in 1957, the National Labor Relations Board reports a rise in unfair labor practice charges. During the July-September quarter, 1619 charges were filed, compared with 1606 during the previous period and 1404 during the first quarter.

The 1619 cases represent an increase of about 13 per cent over the number submitted during the corresponding quarter in 1956. It is the largest number filed since July-September, 1954.

The NLRB received 30 petitions for union shop de-authorization elections during the July-Septem-

Follow-up is important—at Bell & Howell . . .

Employee Attitudes Sparked This

1. A new educational assistance plan was established.
2. Where need was indicated, all job classifications and pay ranges were reviewed and improved.
3. Following recommendations by consultants, the incentive system was reviewed and improved.
4. Driveways and parking lot were improved.
5. Seventh paid holiday was granted.
6. New and better tools, improved working conditions were provided in many areas.
7. Cafeteria service and facilities were improved.
8. New program for security and convenience in parking lots was set up.
9. Employee induction program was revised.
10. Special profit sharing orientation program was instituted.
11. Management inventory and development plan were improved.
12. More training and development courses were added.
13. Additional employee-management committees were established to work on special problems that arise.
14. Staff services and co-ordination among personnel working on different shifts were improved.
15. "Employee Referral Bonus Plan" with cash awards for new employees hired was set up.
16. A broader pre-employment testing program was designed.

ber period, the largest number ever filed in one quarter. The previous high was 20, recorded during October-December, 1954. Five elections were held during the third quarter; two resulted in de-authorization.

The agency conducted 1300 representation elections between July and September. Employees chose a collective bargaining representative in 770 elections, or 59 per cent of those conducted. AFL-CIO unions participated in 1198 elections, won a majority in 689, and lost in 509. Independent unions participated in 115 elections, won 72, and lost 43.

NLRB's general counsel issued 134 complaints during the third quarter, compared with 143 during the April-June period. Sixty were based on charges filed against unions, 54 against employers, and 20 against both unions and employers.

Sprague Builds in West

Sprague Electric Co., North Adams, Mass., will build a 21,000 sq-ft plant at Visalia, Calif. Scheduled for operation in mid-1958, it will house all manufacturing facilities of the Sprague Pacific Div., Venice, Calif.

Admiral Retools

Appliance manufacturer invests $5 million in new production equipment for 1958 line

ADMIRAL Corp., Chicago, has expressed its faith in 1958 by investing $5 million in automatic tools, dies, and other production equipment for its new line of appliances.

James R. Oberly, vice president-appliances, pointed out that all the company's products have been completely redesigned for 1958.

Expect To Gain—The investment is the largest ever made by Admiral, according to Mr. Oberly. Its purpose is to enable the company "to continue to gain an increasing share of the market in the years ahead," he said.

Already installed in the company's "Appliance City," Galesburg, Ill., are:

A 35 ft (22 pass) roll forming machine; automatic combination refrigerator cabinet shell bender and welder; automatic refrigerator cabinet backwelder; automatic refrigerator cabinet corner and gusset welder; automatic refrigerator food liner combination bender and welder; six automatic arcwelders; portable press and gun welder; automatic backwelder for freezer; automatic freezer food liner seam welder; automatic freezer food liner squaring and tackwelder; two roll forming machines for freezer cabinets and liners; dehydration and test equipment for chest freezers; new assembly line for chest freezers; new fabrication line for chest freezers; 300-ton punching press; automatic expander for range covers; automatic range cover welder; automatic range backwelder; automatic freezer cabinet insulating machine.

By the end of this month a new shear and slitting line for steel will be operating. It will process huge coils of steel into required lengths and widths, work formerly done by Admiral's steel suppliers.

Silver Producer Grows

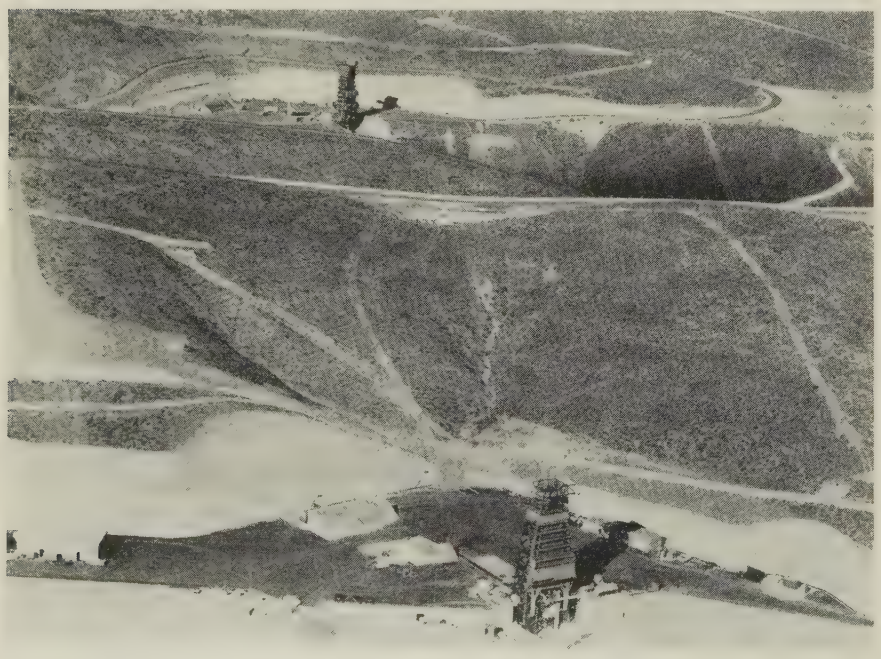
Handy & Harman, New York, is building a new plant, its fifth, at El Monte, Calif. The 23,000 sq-ft facility will include an office, laboratory, refinery, operating area and warehouse. Scheduled to open in February, 1958, it will have twice the capacity of the firm's present west coast plant at Los Angeles, which will be closed.

The one-story plant of tilt-up panel construction will serve manufacturing jewelers, silversmiths and industrial customers. The lab will be equipped for precision analysis of gold, silver, platinum, and other metals. The operating section will have mills for rolling sterling bars and heavy sheets, power shears, wire drawing machines and bright annealing furnaces. H. A. Folgner, Los Angeles plant manager, will head up the new unit.

Operations Research Gains

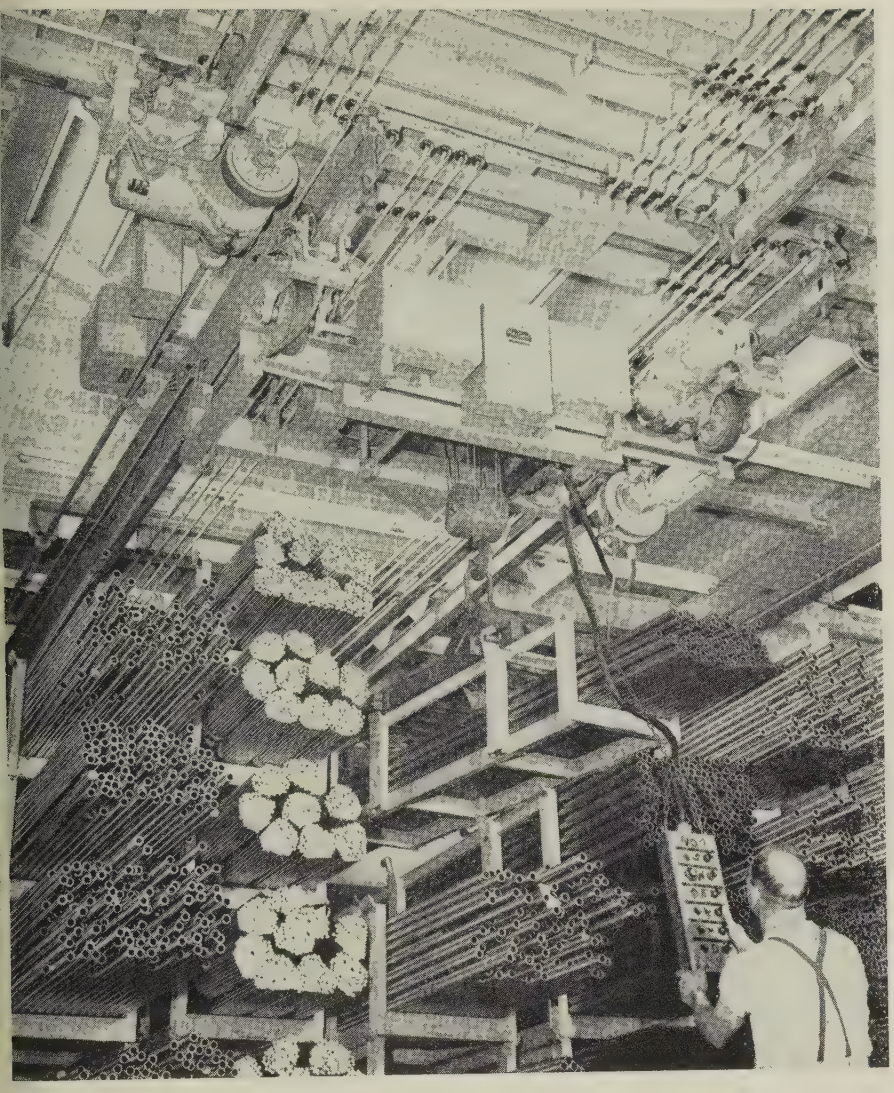
Operations research, a scientific method of attacking business problems, is growing in U. S. industry. A survey by the American Management Association shows that among 631 reporting firms, 51.3 per cent are using the technique.

Of the 307 reporting companies that said they were not using operations research, 144 said they were considering it.



Aerial View of Atlas ICBM Test Facility

Atlas missiles in pilot production at Convair-Astronautics, San Diego, Calif., are static test fired on the stands shown here. More than 19,000 wires connect the control building at lower left with the nearby stand



Bar and tube storage racks are stacked six high (note interlocking corners)

Adaptation Still Pays Off

A MATERIAL handling idea introduced nearly a decade ago is still paying off for Diamond Chain Co. Inc., Indianapolis. As originally installed, the system cost $105,000, but with additions and improvements, it now represents a $180,000 investment. It has long since paid for itself.

Back in 1948, Diamond's purchasing agent, E. W. Allen, was asked to improve material handling. Here's how he did it:

Idea — With knowledge gained from a material handling show in Philadelphia and visits at steel warehouses, he concluded that stationary bar racks store the maximum amount of material. Steel tongs designed by Heppenstall Co., Pittsburgh, sparked the idea of movable, stackable bar racks.

Problem—Diamond Chain uses bars, flats, tubing, and coiled wire to make chain, sprockets, and couplings. Each material required a different type rack. Palmer-Shile Co., Detroit, designed and supplied them. Heppenstall Co. built automatic tongs for each.

Previously, materials were removed from freight cars and trucks manually, transported by industrial trucks, piled on the floor or in fixed racks. As needed for processing, they had to be hand piled on trucks and pulled by tractor to production lines.

Solution—Three types of racks—one for bars, flats, and tubing, one for coils, and a pallet-design for finished chains—were built by Palmer-Shile Co.

Bars racks have open tops and ends for easy placement or removal of material. Interlocking corners (see illustration) prevent shifting and make them easy to tier. Tongs suspended from a floor-operated hoist automatically pick up, transport, and deposit them. The tongs require only 23 in. headroom and no clearance between racks.

Coil racks are of the same design but have closed bottoms. Each holds 3 tons. Tongs need only 13 in. headroom here. Power equipment moves the racks to production areas.

The pallet racks, which carry finished chains to storage and shipping departments, are smaller with solid bottoms. They're moved with tongs and fork or lift trucks.

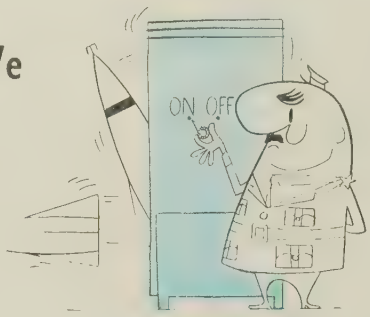
Operation—Diamond brings the inspection to the material. It's spark tested and gaged at the receiving docks, then placed in racks. Tongs grab the racks; a crane moves them to a platform scale; they're weighed and transferred into the warehouse. Here, they're tiered 6 high and close together, eliminating secondary aisles. When needed in production, a rack is picked up by crane, set on a six-wheeled power truck, and moved to the line.

Coil racks are moved right into the freight cars, where the coil is classified and loaded while an inspector gages and examines it. Power trucks move these racks to the scale, then to the warehouse. Tongs remove the racks from the truck and position them according to coil grade and size.

Results — Diamond Chain can now receive and process for storage 60 tons of steel in 2 hours 15 minutes. (It formerly took 20 hours.) Other advantages:

- It stores three times as much steel in the same amount of space.
- It minimizes handling.
- It eliminates storage racks at automatic screw machines.
- It improves inventory control.
- It protects steel surface finish.
- It provides safety for personnel.

How Fast Can We Make Missiles?



HERE'S the best guess on present production of the larger U. S. missiles: Two Thors and two Redstones a month. Following Defense Secretary Neil McElroy's announcement that both our IRBMs, the Thor and the Jupiter, will be produced, STEEL learned that some "preliminary engineering" has been done on the Jupiter to take it out of the handmade stage. Look for some production to begin within six months.

We can probably make four to six Thors a month when we decide to spend the money. Our IRBMs cost us about $2 million each. The Army's Redstone can also be pushed to six a month at this time, but there will be no mass assembly until we stick to one design. Thors, Jupiters, and Redstones are still in the stage in which innovations are incorporated into their design at almost any point along the production line.

The Navy's Polaris IRBM is a little ahead of schedule. It should be test fired in 1958; some production should start in 1959. Of our ICBMs, the Atlas leads the Titan because the Atlas is not a totally new missile. It has been put together in somewhat the same way the Army constructed its Jupiter-C (from the Redstone and Corporal for a satellite firing). Indeed, the Thor is described as a "designed down" version of the Atlas.

The Titan remains a year behind the Atlas. Reliable sources say it is a better missile than the Atlas because it incorporates totally new principles of construction and guidance, while the Atlas contains much of what is already to be found in our smaller missiles.

Mass Production Is Far Off

Conclusion: Anything like mass production of IRBMs is months away, ICBMs years away. The Thor is the best candidate for mass assembly in 1958. If we get any IRBMs to Europe next year, the sum will be less than 20, guess some sources. They point out that half the Thors now made fail to fire. Presumably, we won't send any defective birds to Europe. The ratio of Jupiters which work is no better.

Could we do anything to speed up the process? Although some congressmen think we can, and will advocate a special missile department isolated from the Defense Department's interservice struggles, it is doubtful. As originally designed by the Defense Department, our missile program must go throu a long testing period before it is off the ground f good. We have barely entered that testing peric We need to fire dozens of IRBMs a month to lea enough about them to warrant mass production.

Michigan Missile Center

Warren, Mich., is shaping up as our midweste missile center. The government's plant there operated by Chrysler Corp. and has been maki jet engines and doing research and assembly missile components. Redstones are shipped direct from Warren to Florida for firing. They are al assembled at the Army's Huntsville, Ala., arsena but it looks as if both Jupiter and Redstone pr duction will be centered at Warren.

Considerable subcontracting has gone out fro the Warren plant to Michigan companies; more w follow next year. Employment in the first nin months of this year has run around 4000, inclu ing 800 hourly workers and 3200 salaried worker The plant is on a 297-acre site and contains 2 mi lion sq ft of manufacturing space. Huntsville regarded primarily as a trouble shooting center.

Air Force Claims Space Province

To show it wasn't caught napping by Mr McElroy's plan to name a special Defense Depart ment (no service connection) manager for spac projects (STEEL, Nov. 25, p. 59), the Air Force say "air and space are indivisible." Mr. McElroy's pla is to keep space projects in the hands of his spe cial manager until they become operational, the turn them over to the single service with the mis sion to use them. He carefully points out that spac projects "have no special service connection."

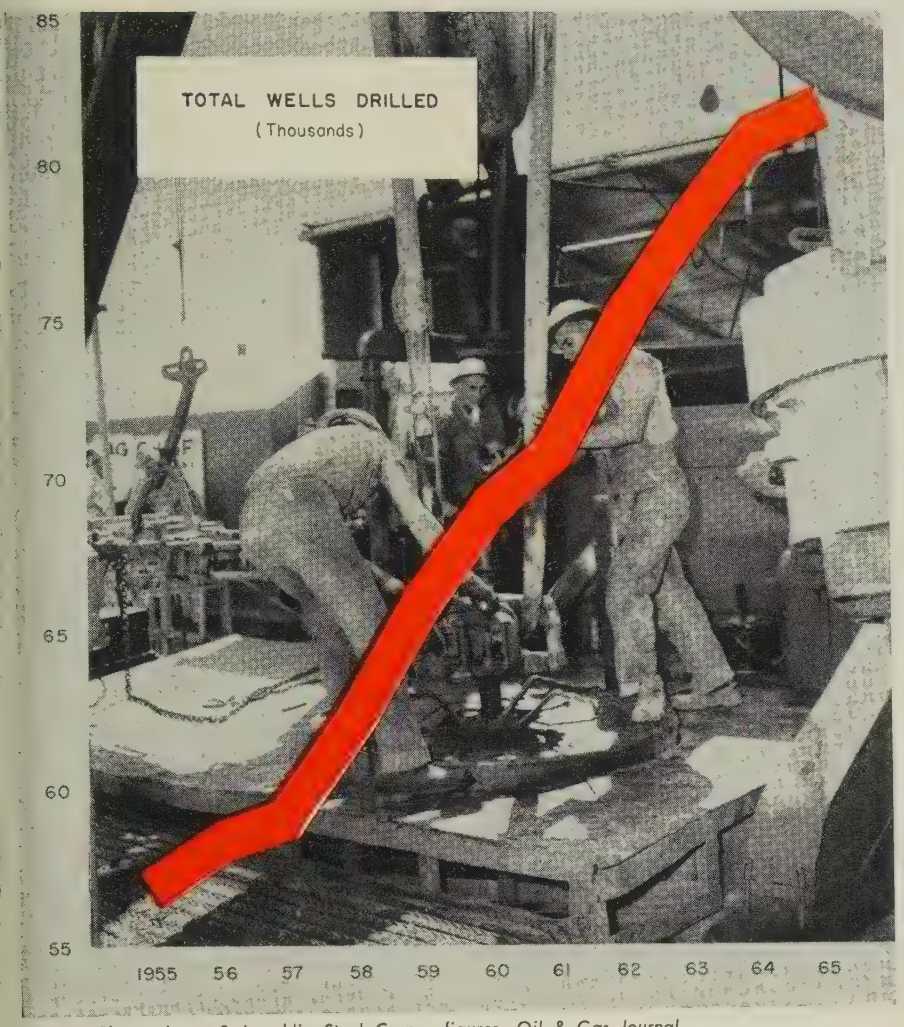
Since the AF's point of view has been expresse publicly by its chief of staff, Gen. Thomas White it looks as if Mr. McElroy has had his first expe rience with interservice rivalry. Whether he ha the courage and power to keep the general in hi place remains to be seen.

Countering the Army's demand for $7 billion t develop an antimissile missile, General White als notes the country won't be safe if it thinks in term of defense; we must think in terms of offense. Th best defense is to destroy an enemy's home base says the general.

Another Generation of Bombers

Possibly because of our missile production prob lems, General White believes we will have at leas one, perhaps two more generations of bombers be fore we have an operational ICBM. The bombers wil replace the B-52. (The B-58 is not a replacement fo the B-52, says the general.) The first new genera tion is the WS-110 project, which will be announce soon after the first of the year. A second generation is still in the drawing board stage.

Projected Drillings: Gusher for Suppliers



Sources: Photo, Jones & Laughlin Steel Corp.; figures, *Oil & Gas Journal*.

Oil Goods Dip, but Will Rise

"THERE WILL be plenty of business in 1958 for companies that haven't forgotten how to sell," says a supplier of oil field equipment.

American Iron & Steel Institute, New York, says that production of oil country goods (tubing, pipe, casing), nearly doubled between 1949 and 1956—rising from 1,366,000 tons to 2,560,000 tons.

So Far, So Good—American Association of Drilling Contractors, Dallas, says new oil and gas wells completed in this country rose from 38,962 in 1949 to 58,160 in 1956.

Average well depth increased from 3558 ft to 4022 ft in the period, meaning more steel per well was used.

Demand from foreign countries also rose rapidly and continued to gain in early 1957. National Supply Co., Pittsburgh, says foreign sales in 1956 were about 33 per cent above those of 1955. In first half of 1957, sales abroad rose 50 per cent over those in the similar 1956 period.

Hitting a Ceiling—Shipments of oil country goods came to 2,268,000 tons in '57's first nine months—well on the way to another record year. Heavy foreign demand made up for slowness in the domestic market, but it is on the decline now.

Drilling slowdowns in this country were caused by poor weather in the Southwest early this year and a temporary oversupply of crude oil.

Cutting Stocks—Large oil firms are beginning to follow the trend to lower inventories. Drillers who had placed orders for tubing four months prior to the expected delivery date cut leadtime in half.

The number of rotary rigs operating in the U. S. and Canada declined from 2810 in mid-November, 1956, to 2579 at the same time this year.

Dull Market—S. M. Jones Co., Toledo, Ohio, says sales of sucker rods dropped 23 per cent in first nine months of 1957. Alten Foundry & Machine Works Inc., Lancaster, Ohio, adds that demand for pumping units is 25 to 30 per cent below year-ago levels.

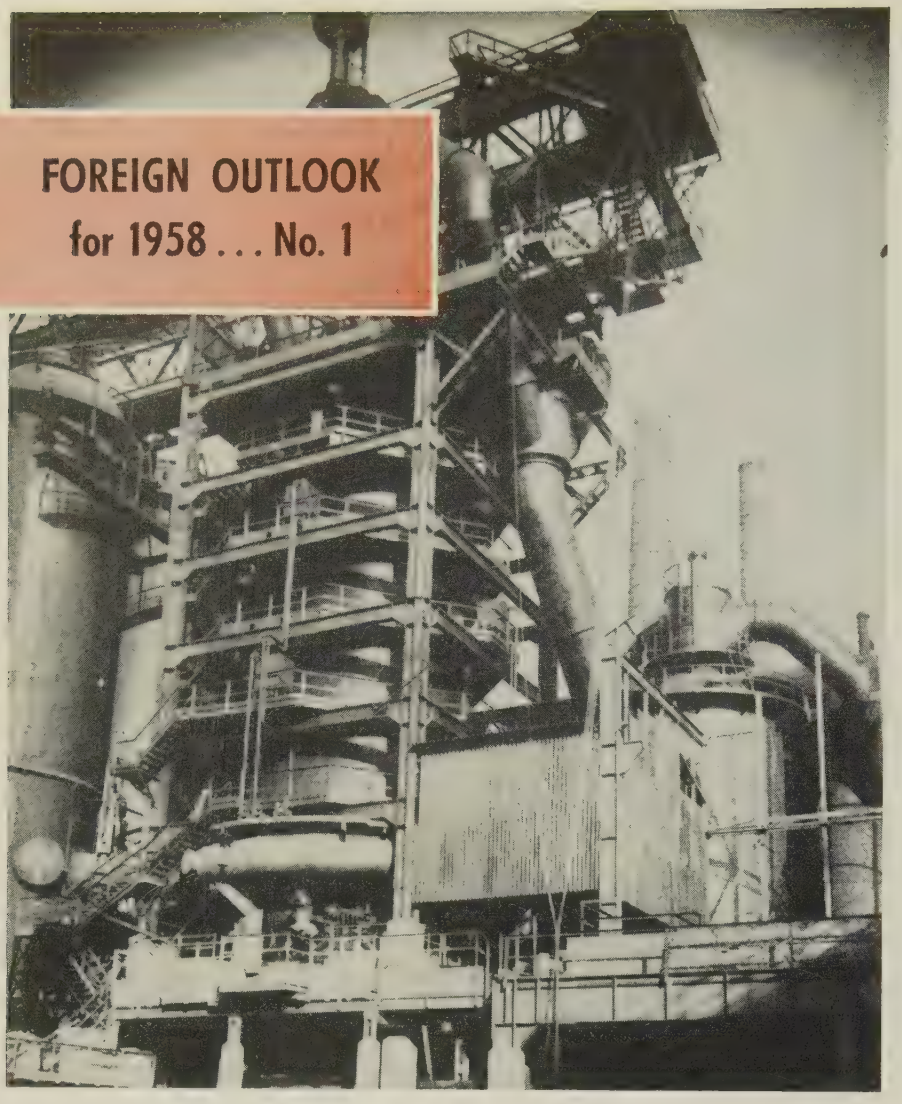
In Shape To Sell — Reports a Pittsburgh tube producer: "For several years, we sold everything we could produce. In adapting ourselves to the 1958 market, we will build up stocks at our warehouses in the Southwest. Drillers predict moderate increase in activity next year, but their current large stocks will restrict demand for tubing. We see hard selling in 1958."

Immediate Outlook—A firm expecting drops in foreign sales in the first quarter of next year sees a "sharp increase in buying later in the year." Another sign of optimism: In November, National Supply opened its third oil field supply store in Venezuela. R. G. Hamaker of Reed Roller Bit Co., Houston, says: "We expect next year's domestic drilling to be above this year's. We also expect foreign demand to increase."

A spokesman for Dresser Industries Inc., Dallas, believes that foreign operations and domestic offshore activity will continue to grow and that there will be nominal improvement in drilling. Dresser expects a 10 to 15 per cent sales gain next year.

Looking Ahead—Oil-gas use rises more than 7 per cent annually, while the amount of oil and gas found per well declines steadily. The situation spells increasing requirements for tubing, machinery.

FOREIGN OUTLOOK
for 1958 . . . No. 1



French blast furnaces, such as the one shown here, will be busy in 1958

France Plans More Steel

She'll increase capacity 20 per cent by 1961 to help economy with stepped up exports to Euromarket. Cost of $1.2 billion will be borne by private firms

PINNING great hopes on Euromarket (STEEL, Apr. 8, p. 69), crisis-ridden France plans to increase her annual steel production to 20 million tons by 1961 — or about 20 per cent.

The money, $1.2 billion, will be put up by private iron and steel companies. In the past, the government has financed expansions.

Problems—In addition to money, the iron and steel group needs 10,000 more workers, or 7 per cent more than it has now. Some financial progress has been made. In October, arrangements were made for a $57.1 million loan.

The expansion plan has been delayed twice, first by the Suez crisis, then by the partial devaluation of the franc in August (STEEL, Sept. 9, p. 69).

New Vistas—Faced with the necessity of increasing exports to halt its worsening financial condition, France views the six-nation, tariff-free Euromarket hungrily. The ambitious steel expansion is aimed at hiking exports to it. (If plans for linking Britain's free trade area jell, a tariff-free market of 200 million people will result.)

France increased its exports by 9 per cent in 1957, but her imports jumped 23 per cent, leaving a debit with the European Payments Union of $900,000 in gold and dollar reserves.

Domestic steel prices rose 8 per cent during the year, not enough to cover needed investments. An easing of the steel supply caused producers to take more advance orders. Delivery times on such items as sheets and merchant steel were six to eight months at year's end.

Autos Climb—During the first three quarters of 1957, France's automobile production increased 10 per cent to 583,518 units (passenger cars and trucks). She exported 165,689 vehicles (23,000 to the U. S.), an increase of 36 per cent over the same period in 1956.

The bicycle industry also enjoyed a good year, producing 1 million units, against 870,000 in 1956.

Scrap iron was in slightly better supply toward the end of 1957. During the first half, French and Saar steelworks purchased 1.8 million tons of scrap—228,800 tons were imported.

Fuel Lags — Fuel difficulties started by the closing of the Suez Canal still plague the economy. Coal remains the chief fuel for iron and steel and the metalworking industries. The modernization of mining methods enabled France to increase coal production but not enough to meet demand.

Coal consumption for 1957 is estimated at 90 million tons, against production of less than 30 million tons. The difference was made up by imports, which added to the adverse balance of trade.

Natural gas wells, discovered near Lacq, in southern France, are producing 35.3 million cu ft a year. Production is expected to increase to 176.5 million cu ft by the end of next year, and to 706 million cu ft by 1961.

Electric Power—A new thermoelectric powerplant with an output of 575,000 kw was built near Paris. An additional 263,000 kw is expected to be available from this plant soon.

Targets for additional electric power by 1961: 890,000 kw, hydroelectric; 500,000, thermoelectric. A nuclear energy plant is in operation at Marcoule; another is being built at Chinom.

A new oil field with an estimated reserve of 2 billion barrels was discovered in the Sahara Desert (STEEL, Sept. 9, p. 69). But it is too near hostilities in Algeria for immediate development.

More Problems — Unrest among workers, strikes, and demands for higher pay still beset the country. There have been civil clashes over the Algerian War, which continues to siphon $850 million yearly from the economy. Government is unsteady. Rising living costs and economic pressures portend further devaluation of the franc as the Third Republic enters 1958.

Sweden Eyes Auto Market

She shipped over 5000 cars to U. S. market during first three quarters of this year. Shipbuilders expect to increase foreign deliveries 40 per cent in 1957

SWEDEN, following the lead of other European countries, will bid for a bigger slice of the automotive export market in 1958.

In 1957, Swedish autoworkers more than doubled their 1956 production. During the first three quarters of 1957, 10,000 units were produced (more than half came to the U. S.), against 4000 in the same period in 1956.

Ford Motor Co. and General Motors Corp. have closed their assembly plants in Stockholm and are shipping their cars in from the U. S., West Germany, and the U.K.

Shipyards Busy — Shipbuilders employed 13 per cent more workers than they did in 1956 to up foreign deliveries 40 per cent, domestic deliveries 15 per cent. Facilities have been expanded to increase production next year.

Other metalworking industries had lower comparative gains than auto and ship makers in both production and employment, but all metalworking products accounted for 40 per cent of Sweden's total exports in 1957. New orders dropped some the last half, but a fairly stable volume continues. About 25 per cent of new orders are from out of the country.

An unfavorable harvest and reduced farm income dampen the outlook for producers of agricultural machinery for 1958. Another minus factor in the economy: Government credit restrictions hamper capital investment.

General Economy—On the whole, 1957 has been a stable year for Sweden. Imports rose 6 per cent, but exports went up 10 per cent. During the first half, steel production increased 9 per cent, and imports of some steel products climbed 40 per cent. As a result, some items were in oversupply, and steel prices dropped slightly. In the second half, steel production eased, and imports of steel products dropped.

Iron Ore Slow—Iron ore production reached 21 million tons in 1957, a few hundred thousand tons more than the 1956 figure. The big Kiruna mine, north of the Arctic Circle, which produced half the total, is in the process of switching from open-cast to underground mining.

Iron ore amounted to 10 per cent of total exports. Present plans call for production of 25.3 million tons of iron ore by 1965—about 20 million tons will be available for export.

Problems — Inflationary pressure continues, and despite tightening of government monetary policies, consumer prices rose 4 per cent in 1957. Gross national product increased 3 per cent, sparked by a similar gain in the production of consumer goods.

Volume of consumption rose only 1 per cent. Low capital investment hit the building trades particularly hard (and housing is one of the nation's knottiest problems).

The Bank of Sweden raised its interest rate to 5 per cent in an effort to stimulate investment, but the response has been slow.

The recent decision of Sweden, Norway, Denmark, and Finland to place 80 per cent of their trade items with each other on a free list should benefit the economy. But investments from abroad and in the country are needed to increase 1958 industrial production.

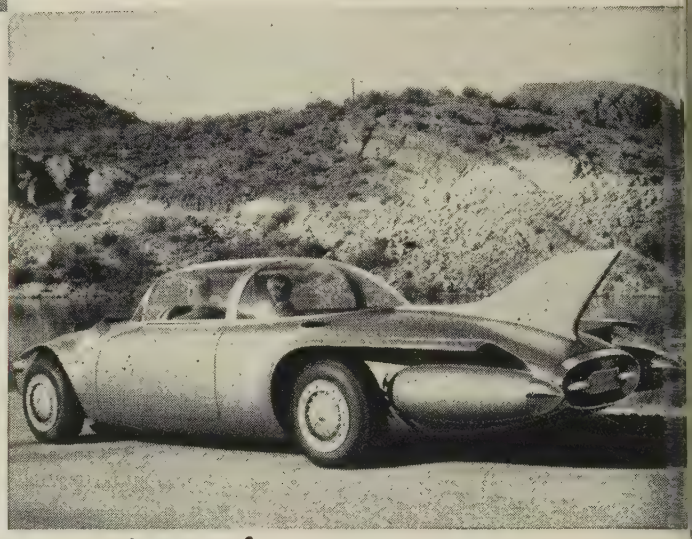
This line at Swedish Volvo plant assembles a car in 3½ minutes

THE HEAVIER THE LOAD...

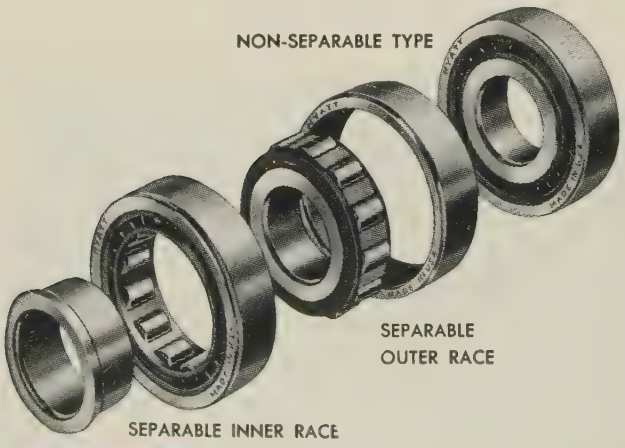
the more you need HYATTS . . . because size for size, no other kind of bearing made can equal straight cylindrical roller bearings for sheer load-carrying capacity in heavy-duty service. That's why John Deere uses HYATTS in this combine.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because their uncompromising combination of superior steels, precision manufacture and scrupulous control of internal clearances assures smoother performance in high-speed applications like the famed *Firebird II.*



THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS



Today, with loads and speeds trending upward and space often at a premium, many a manufacturer is finding that bearings of limited capacity are no longer good enough. If you are seeking ways to squeeze better life/load ratings into smaller housings, HYATT has the answer. Shouldered-race HYATT HY-ROLLS will not only solve your radial load problem but take a surprising amount of thrust, too. Ask your nearest HYATT Sales Engineer for recommendations—he's a mighty good man to know! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY

GM GENERAL MOTORS

Slip in six-cylinder engines . . . helps imports and . . . changes domestic line-up

Engine Output
(Per cent)

	V-8s	Sixes
1957†	82	18
1956	80.2	19.8
1955	78.6	21.4

†Projected.

Foreign Car Sales
(Thousands)

1957†	204.5
1956	98.2
1955	51.6

†Projected.

Six-Cylinder Sales
(Percentage of U. S. built*)

	'57	'56
Chevy	51.9	58.0
Ford	22.3	13.6
Plymouth	15.0	15.8

*First nine months.

All charts adapted from Ward's Automotive Reports.

The 'Six' May Come Back

Foreign cars and low-priced, optional V-8s still cut into sales of six-cylinder engines, but economy trends may make the smaller engine more popular

SALES of six-cylinder engines continue to decline because car buyers can get a high-powered V-8 in low-priced models for as little as $100 to $120 extra.

And more people who are interested in the economy of a six-cylinder job are switching to four-cylinder foreign cars which are even cheaper to operate.

Despite such influences, the half dozen car divisions that still carry these engines have a yearly market for a million units. If predictions of some Detroit hopefuls pan out, the economy six may stage a comeback.

History—As recently as 1952, 51 per cent of all U. S. passenger cars were powered by sixes. Two-thirds of the other powerplants were V-8s; the rest were straight 8s.

Ford, Chevy, Plymouth, Dodge, Studebaker Champion and Scotsman, and the American Motors' Rambler offer six-cylinder engines. The Studebaker and AMC models account for only 10.8 per cent of sales. Ford, Chevy, and Plymouth should find it worthwhile to compete for the remaining 89.2 per cent.

Juggling Results—But it hasn't turned out that way this year. Plymouth and Chevy boosted V-8 production and touted the higher horsepower engine in advertising campaigns.

Ford was the only one of the low-priced three that made an effort to capitalize on the economy market. Its share of six-cylinder sales has increased more than 8 per cent.

Shows Slowdown—But the death of the horsepower race has caused some changes in Chevy's attitude at least. Edward N. Cole, Chevy's general manager, puts it this way:

"There is going to be more interest in the economy area, and I think the six will step forward and, probably, hold its own. I don't forecast the six will increase, but I think we are reaching the point of diminishing returns for eight-cylinder cars."

Chevrolet is producing just under 40 per cent of its cars with six-cylinder engines, although half of its output was in sixes last year. Mr. Cole adds that almost 90 per cent of eastern car buyers prefer the smaller engine, while a like number on the West Coast specify the V-8.

Imports Compete—Four-cylinder cars continue to cut into the American market.

Mr. Cole and others already have stated that as soon as foreign-built sales reach the half million mark, U. S. car builders will probably start making smaller vehicles.

According to some Detroit sources, the cars won't be as small as the Volkswagen or Renault; they will be more the size of the Willys, with wheelbases of 106 to 108 in.

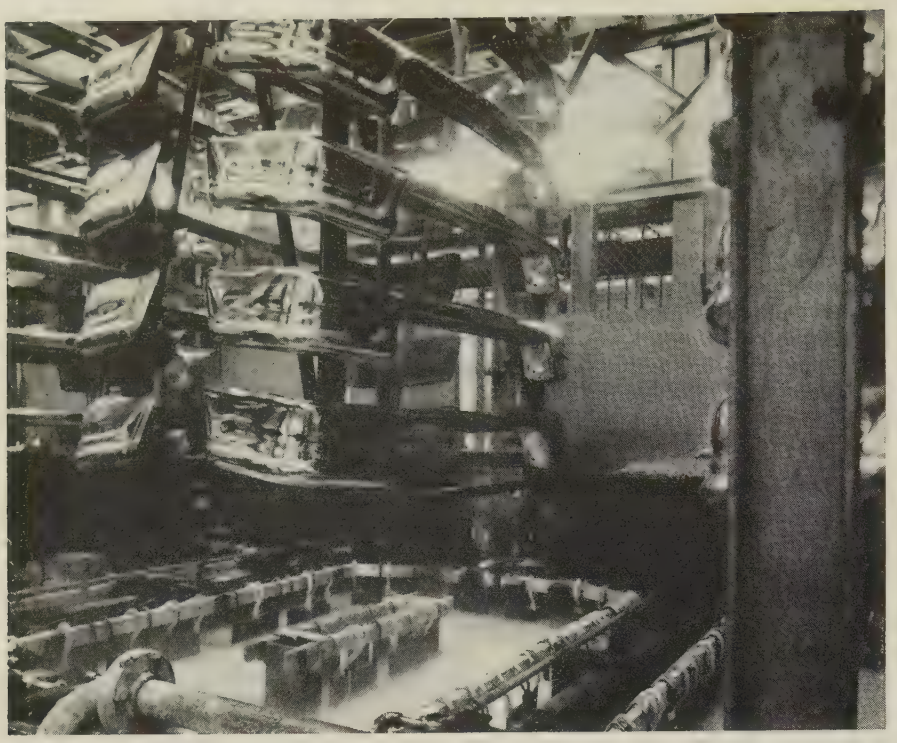
Such cars could best be powered by a six. It certainly would make for less expensive manufacturing because engine plants are tooled to build sixes.

Ready To Go—Chevy reportedly has two smaller cars it can put into production if the need arises. Those in the know say one is a front-end drive; the other has the engine in the rear.

Ford's international division is investigating the possibility of building a slightly larger version of the English Ford over here. This car could be powered by a six. Chrysler Corp. has not developed any smaller cars it could put on the road. It may buy out a foreign manufacturer to gain an overseas market, too.

Latest reports have it Studebaker-Packard has scrapped plans for marketing the Go-Go-Mobile, a foreign car similar to the Isetta.

Outlook—If the economy trend



Extra Coating Gives Ford Better Bumpers

Bumpers in Ford Motor Co.'s Monroe, Mich., parts plant are coated with white brass as well as copper, nickel, and chrome in one of two 700-ft plating machines. Each line processes 35 racks of bumpers an hour through ten stages of a 3½-hour cycle

continues, American automakers soon may want to re-enter the small car field. Most of the offerings probably will be slightly larger than present day foreign imports even though previous cars of this size haven't met with much success. Several are likely to have six-cylinder powerplants.

Sees Solar-Powered Cars

Silicon converters which transform sunlight into electrical energy may be the means for eventually running automobiles, says James C. Zeder, vice president, Chrysler Corp., Detroit.

"If we continue to increase the efficiency of these converters, and if we are able to develop small, efficient energy storage cells, it's possible that sometime before the end of the century the automobile industry will be producing cars driven by solar power," says Mr. Zeder.

His comments on solar power show Chrysler is leaving no stone unturned in an effort to come up with a better powerplant. The company, so far, hasn't developed its gas turbine engine to a production point, while General Motors has at least one turbine model it can put into production if the need arises.

Ford as well as Chrysler still lacks a production type job. Ford's fuel feed system seems to be causing trouble.

It's understood the company has made some engineering alliances in an effort to develop better fuel injection. All three companies still have engine tooling which has to pay for itself before they can think seriously about turbines.

Maeco Hardens Shafts

Monroe Auto Equipment Co., Monroe, Mich., is using induction heating to harden shock absorber shafts in its Hartwell, Ga., plant.

Three 40-kw induction heaters are used. Each one hardens 500 thirteen-in. shafts per hour. Maeco formerly used a chrome plating process.

According to General Electric Co., Schenectady, N. Y., which installed the system, it takes up less floor space and is almost completely automated. The chrome hardening process required more manpower and was a batch type operation.

The shock absorber shafts are formed on a screw machine, then passed through a centerless grinder. Induction heating, water quenching, and two more grinding operations, plus lapping, complete the process.

Only two men are used, one to feed stock into the screw machine and a checker to inspect finished parts as they come from final lapping.

Exhaust Notes

- Edsel's sales in October were 7601, compared with 11,655 sold in September.
- Rambler sales increased from 3873 in September to 9680 in October. Some 6690 Ramblers have been sold in the first 20 days of November.
- Ford of Canada will lay off 1400 men at its Oakville, Ont., plant, and another 1000 at its Windsor, Ont., plant this month because of a sales slump.
- Studebaker has added two hardtops, one each in the Commander and President series, to its 1958 model line-up.
- Poland produces about 8500 cars a year for domestic sale. Average price is 120,000 zlotys ($5000). The average monthly wage in Poland is 1200 zlotys.

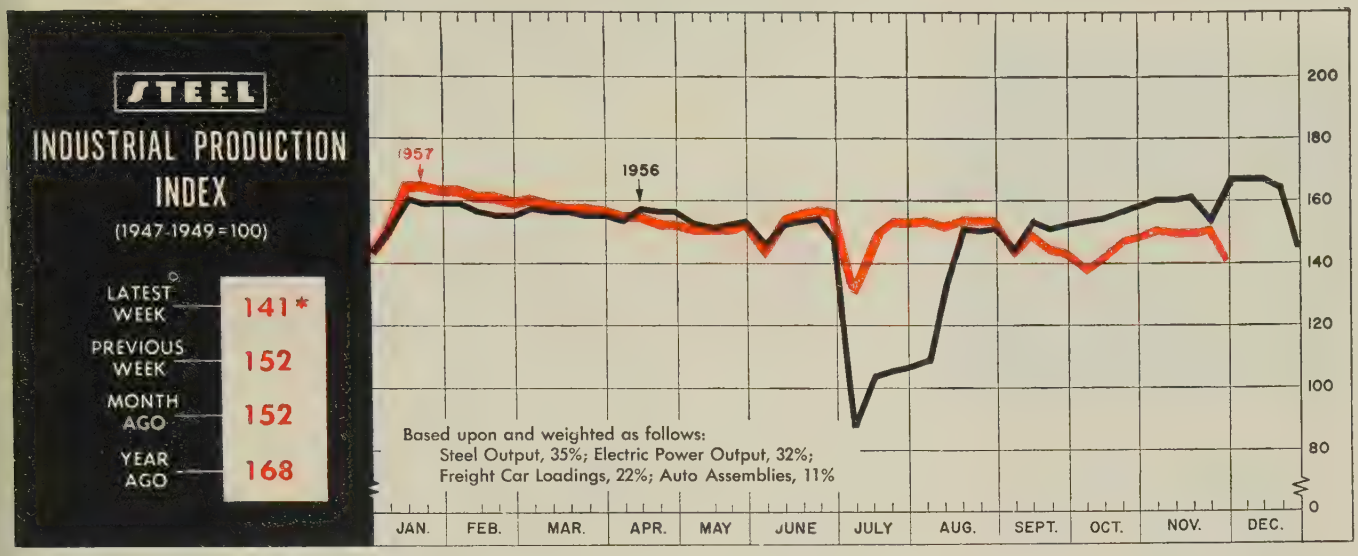
U. S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
October	327,362	389,079
November	585,900†	580,803
11 Mo. Total	5,580,398†	5,204,650
December		597,226
Total		5,802,808

Week Ended	1957	1956
Nov. 2	126,139	117,583
Nov. 9	136,742	132,087
Nov. 16	141,902	135,641
Nov. 23	151,846	118,949
Nov. 30	120,557†	159,976
Dec. 7	150,000*	167,576

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.



*Week ended Nov. 30.

Third Quarter Upturn Possible Next Year

THE CURRENT DIP in the nation's economy probably will be shallow compared with the recessions of 1949 and 1953-54. The plusses in the business equation are still potent enough to keep the minuses from throwing the whole economy too far out of balance.

Many economists are predicting the recession will bottom out around midyear in '58. An upturn in the second half could be triggered by a combination of any of several probabilities.

Inventory Liquidation — Stocks of both raw materials and finished goods are still adequate despite the long period of adjustments dating back to the second quarter of this year. But they are getting down to the point where it is dangerous to cut them much more. Most surveys of purchasing agents indicate that the liquidation will continue for perhaps another six months. By then, an upturn should be in order.

Construction—The highway program should finally come to full blossom by midsummer and stimulate purchases of building materials and heavy construction equipment. Such activity, coupled with an increase in nonresidential building and a modest upturn in housing starts, should counterbalance the decline in industrial construction.

Federal Spending — Most talk still centers on a $40-billion defense budget next year, but nobody would be surprised to see the annual rate rise by a billion or two toward second half, especially if Russia announces any new developments in missiles or earth satellites. In addition, state and local government spending will rise by about $2.5 billion next year.

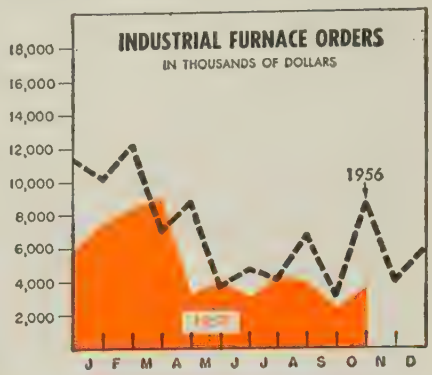
Consumer Spending—A rise in unemployment and shorter workweeks will not be enough to send consumer spending in a nose dive. Not as much will be spent for hard goods, but nondurable goods and services will increase their take of

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,843[1]	1,846	2,493
Electric Power Distributed (million kw-hr)	11,800[1]	12,136	12,075
Bituminous Coal Output (1000 tons)	9,330[1]	9,120	9,069
Petroleum Production (daily avg—1000 bbl)	6,700[1]	6,832	7,133
Construction Volume (*ENR*—millions)	$378.7	$332.3	$377.1
Auto, Truck Output, U. S., Canada (*Ward's*)	146,701[1]	184,365	196,571
TRADE			
Freight Car Loadings (1000 cars)	510[1]	633	752
Business Failures (Dun & Bradstreet)	308	306	207
Currency in Circulation (millions)[3]	$31,431	$31,336	$31,355
Dept. Store Sales (changes from year ago)[3]	+4%	−1%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,554	$24,580	$19,575
Federal Gross Debt (billions)	$273.8	$273.7	$276.7
Bond Volume, NYSE (millions)	$20.7	$26.6	$35.0
Stocks Sales, NYSE (thousands of shares)	12,316	12,505	11,286
Loans and Investments (billions)[4]	$86.3	$86.1	$86.4
U. S. Govt. Obligations Held (billions)[4]	$24.9	$24.8	$26.3
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	205.7	205.8	256.2
All Commodities[7]	117.8[1]	117.8	115.9
Commodities Other Than Farm & Foods[7]	125.6[1]	125.6	124.2

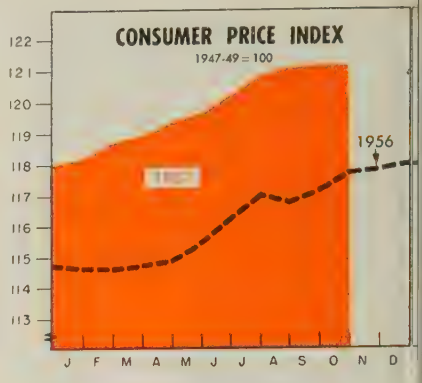
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

THE BUSINESS TREND



	1957	1956	1955
Jan.	7,380	10,244	4,973
Feb.	8,373	12,163	5,616
Mar.	9,090	7,025	7,345
Apr.	3,164	8,803	7,639
May	3,994	3,667	6,205
June	2,974	4,748	5,812
July	4,332	4,140	4,338
Aug.	3,924	6,722	6,273
Sept.	2,337	3,057	8,351
Oct.	3,621	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.



	1957	1956	1955
Jan.	118.2	114.6	114.[illegible]
Feb.	118.7	114.6	114 [illegible]
Mar.	118.9	114.7	114 [illegible]
Apr.	119.3	114.9	114 [illegible]
May	119.6	115.4	114 [illegible]
June	120.2	116.2	114.[illegible]
July	120.8	117.0	114 [illegible]
Aug.	121.0	116.8	114.[illegible]
Sept.	121.1	117.1	114.[illegible]
Oct.	121.1	117.7	114.[illegible]
Nov.	....	117.8	115 [illegible]
Dec.	....	118.0	114.[illegible]

U. S. Bureau of Labor Statistics.

Charts, copyright 1957, STEEL.

the worker's earnings and savings. Consumer spending next year could hit a new peak of $287 billion, compared with $281.6 billion this year.

Autos—While sales of 1958 models have been disappointing so far, producers are still in high gear. There may be an attempt to build up stocks in dealers' hands in anticipation of a strike in June (see STEEL, Dec. 2, p. 53). If there is a strike of major proportions, it will almost surely be followed by heavy production which could set off a significant third quarter upswing next year.

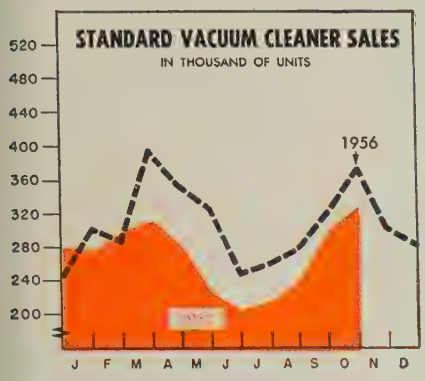
Another possibility that shouldn't be dismissed lightly is a tax cut next year. Many congressmen have recently come out against any reductions in view of anticipated higher government defense spending. But congressmen are politicians, and if they think the dip is going to go too far, they can change their minds in time to do them some good at election time. They voted for tax relief during the 1949 and 1953-54 recessions. Those cuts are credited as major factors in the business improvement that followed.

Taking into account the change in character of national spending from hard goods to soft goods and services, plus a minimum of 1 or 2 per cent inflation next year, it is possible that gross national product in 1958 may exceed this year's estimated $435 billion. It could reach about $437.5 billion, despite a drop in production to an average of about 140 on the Federal Reserve Board's index.

Economist Out on Limb

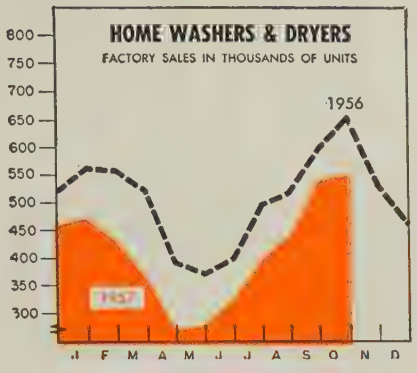
Karl O. Nygaard, director of business research for B. F. Goodrich Co., Akron, is even more optimistic. He feels there is "no boom or recession in prospect for the next six to nine months . . . Next year will see a reasonably full employment of our national economic resources," he says. "Beyond mid-1958, it is even possible that the economy could show an abrupt upturn."

He sees the gross national product at an annual rate of about $450 billion by mid-1958, reflecting not only rising prices but also an increase in the volume of business. He also emphasizes the role of heavy consumer spending. "Some gradual improvement is anticipated for early 1958, with the possibility of a much sharper pickup later in the year."



	1957	1956	1955
Jan.	276,738	302,203	248,941
Feb.	300,887	286,386	261,183
Mar.	312,746	395,686	356,444
Apr.	281,627	352,873	241,870
May	231,246	326,008	255,941
June	207,286	248,326	239,728
July	218,276	259,774	206,758
Aug.	241,218	276,932	252,691
Sept.	302,869	320,278	306,507
Oct.	328,655	371,998	349,654
Nov.	.....	300,381	307,267
Dec.	.....	281,025	243,457
Totals	.....	3,721,870	3,270,441

Vacuum Cleaners Mfrs.' Assn.



	Washers		Dryers	
	1957	1956	1957	1956
Jan.	331,314	393,717	144,621	166,243
Feb.	319,580	405,631	114,517	148,522
Mar.	286,205	405,744	83,668	113,031
Apr.	230,675	324,238	42,850	64,923
May	254,195	315,249	31,572	55,330
June	282,289	340,235	46,783	58,441
July	335,139	380,172	70,011	117,548
Aug.	329,046	373,925	116,601	144,537
Sept.	384,299	402,631	164,468	192,724
Oct.	369,487	439,049	185,772	196,569
Nov.	.....	357,935	.....	170,529
Dec.	.....	298,368	.....	162,953
Totals	.....	4,447,254	.....	1,601,710

American Home Laundry Mfrs. Assn.

Construction Looks Good

Latest word from the construction industry is encouraging. Contracts for future construction showed year-to-year gains in October for every major category but one (public works). Total contracts amounted to a little over $2.6 billion, compared with the year-ago mark of $2.443 billion, reports F. W. Dodge Corp. Residential contracts showed an 11 per cent gain, while nonresidential awards were up 5 per cent. The sharp drop in public works awards was more than offset by a huge increase in utilities.

Says Thomas S. Holden, vice chairman at Dodge: "It is encouraging to see contracts for industrial building rising after several months of decline, and the October contracts give further reason to believe that the housing upturn which began in July is solidly based."

Industry Reports

• The sales index of the American Gear Manufacturers Association increased by 18.5 per cent in October to 207.03 (1947-49=100).

• Sales of used machine tools continued to downtrend in October, reports the Machinery Dealers National Association. Its index dipped to 108.9 (1947-49=100).

• After registering one of the best months in its history in August, the new order index of the Foundry Equipment Manufacturers Association plummeted from 231.3 to 113.9 (1947-49=100) in September.

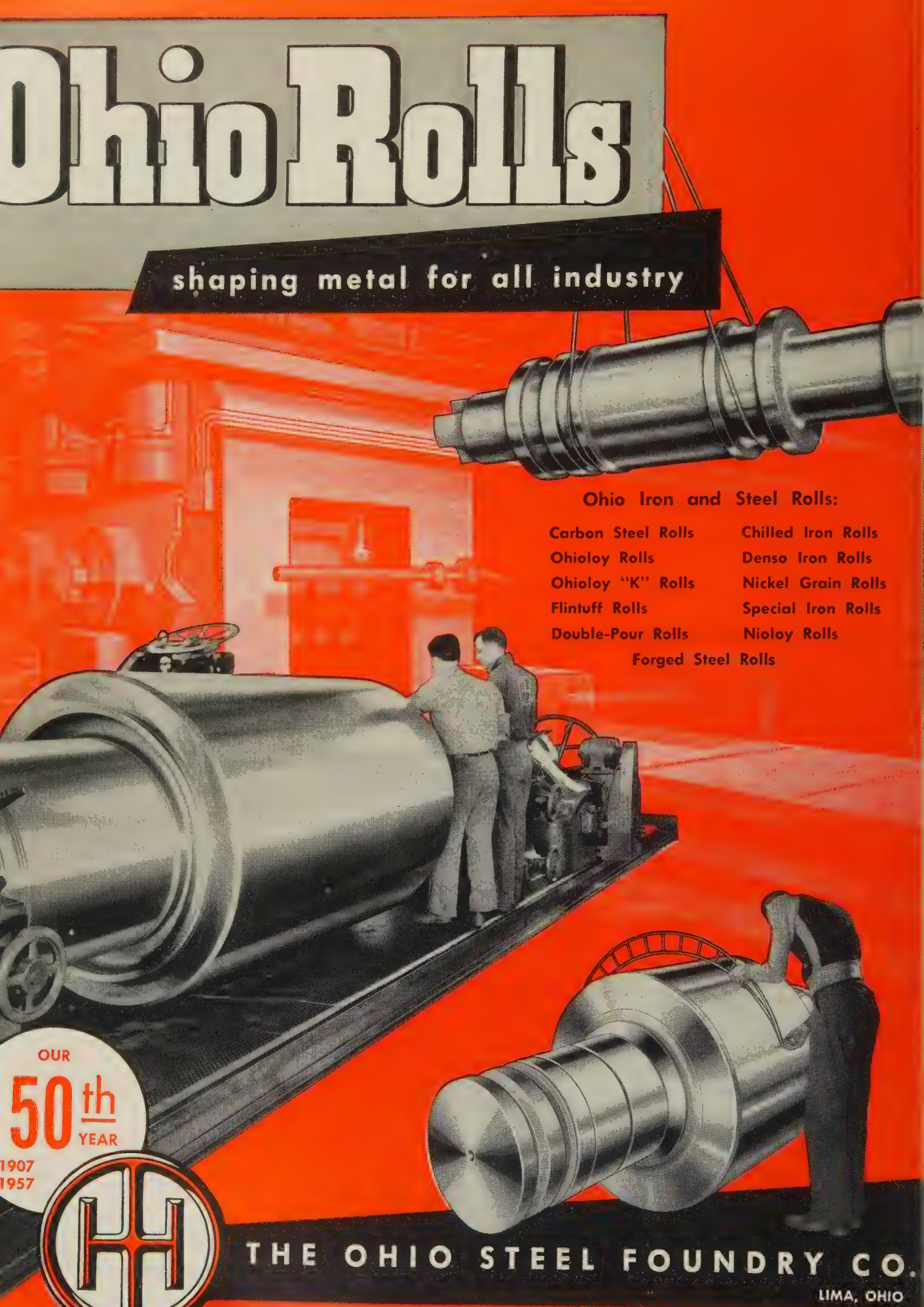
• Shipments of fabricated structural steel fell shy of a record when they reached 330,950 tons in October, says the American Institute of Steel Construction. The record (333,133 tons) was set in August. New orders, at 177,178 tons, were the second lowest of the year. This brought about a further decline of backlogs to 2,683,262 tons.

• New orders of industrial supplies reached an 18-month low in October, reports the American Supply & Machinery Manufacturers' Association Inc. The association's index slid 11 points to 192 (1947-49=100), which is still a high level.

• The Defense Department spent a record $3.506 billion for electronics during fiscal 1957, says Electronic Industries Association. The figure in fiscal 1956 was only $2.802 billion.

Ohio Rolls

shaping metal for all industry



Ohio Iron and Steel Rolls:

Carbon Steel Rolls	Chilled Iron Rolls
Ohioloy Rolls	Denso Iron Rolls
Ohioloy "K" Rolls	Nickel Grain Rolls
Flintuff Rolls	Special Iron Rolls
Double-Pour Rolls	Nioloy Rolls

Forged Steel Rolls

OUR 50th YEAR
1907
1957

THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO

Plants at Lima and Springfield, Ohio

OR13

LESTER E. RUSSELL
Reynolds aluminum plant supt.

ERVIN J. BAUMRUCKER
Clearing Machine v. p.

JOHN R. KEATES
Natco division post

J. RUSSELL DUNCAN
heads Minneapolis-Moline

Lester E. Russell was named superintendent of reduction at the new aluminum plant of **Reynolds Metals Co.**, now under construction at Rooseveltown, N. Y. He is presently assistant superintendent at the reduction plant in Troutdale, Oreg.

Ervin J. Baumrucker was elected vice president in charge of domestic press sales for **Clearing Machine Corp.**, Chicago, a division of U. S. Industries Inc. He was general sales manager.

Frank R. Palmer, president, Carpenter Steel Co., was named president of the newly acquired Northeastern Steel Corp., Bridgeport, Conn., now known as **Carpenter Steel of New England Inc.** Other officers named to the new subsidiary are: **John Moxon**, executive vice president; **Arlington A. Britton Jr.**, vice president-production; **H. Sturgis Potter**, vice president-sales; **Dr. Carl B. Post**, vice president-technical director. They hold similar positions with the parent firm.

Donald T. Bixby was named assistant manager, standard products division, **De Laval Steam Turbine Co.**, Trenton, N. J. He was sales manager of the division.

Robert Twells was appointed group executive in charge of **Electric Auto-Lite Co.'s** spark plug division, Fostoria, Ohio. Mr. Twells, elected a vice president of Auto-Lite in 1948, will co-ordinate accounting, purchasing, production, sales, and engineering for the division.

John R. Keates was made general sales manager, machine tool division, **National Automatic Tool Co. Inc.**, Richmond, Ind. He was New York regional sales manager for the company.

Paul I. Birchard, vice president and general manager, **LeRoi Div.**, Milwaukee, **Westinghouse Air Brake Co.**, joins the staff of the parent company at Pittsburgh on special assignment. Frank J. **Zielsdorf**, former staff assistant at Pittsburgh, succeeds Mr. Birchard as general manager for LeRoi.

Charles L. Gardner was appointed executive staff secretary, executive department, **Republic Steel Corp.**, Cleveland. Formerly secretary to the chairman, he succeeds **A. H. Roosma**, retired. He will be assisted by **Kenneth M. Hinson.**

G. LaRue Gross was made general manager; **Edwin T. Overton**, works manager of **Krupp Mfg. Co.**, Quakertown, Pa. **Deems W. Hallman** has retired but will serve as a consultant.

Severn W. Kittredge was made assistant chief engineer, **Sharon Steel Corp.**, Sharon, Pa. He transfers from the company's subsidiary, Brainard Steel Div., where he was superintendent of the Larchmont plant.

Taylor Instrument Cos., Rochester, N. Y., elected as vice presidents: **Marc E. Porter, Karl H. Hubbard, William M. Walters, L. Lawrence Forward, Nathaniel B. Nichols,** and **Frank S. Ward.**

J. Russell Duncan succeeds **Henry S. Reddig**, resigned, as president of **Minneapolis-Moline Co.**, Minneapolis. Mr. Duncan was vice president of Consolidated Foundries & Mfg. Corp.

Gregor W. Betz was made chief engineer, **Wyckoff Steel Co.**, with headquarters at the Ambridge, Pa., plant. He succeeds **William C. Undercoffler**, retired.

Charles E. Ripka III was made purchasing agent at the Bridgeport, Conn., plant of **Heppenstall Co.** He succeeds **Harry von Hacht**, retired.

William R. Cook was appointed wire mill superintendent of the Buffalo plant of **Wickwire Spencer Steel Div.**, Colorado Fuel & Iron Corp. Before joining CF&I, Mr. Cook was assistant wire mill superintendent with Union Wire Rope Corp.

Gene DuGar was made district manager at Cleveland for **Baker-Raulang Co.**, subsidiary of Otis Elevator Co.

George N. Proctor, vice president, was made general manager, Permutit Div., **Pfaudler Permutit Inc.**, Rochester, N. Y., with **Robert Van Iderstine** as assistant general manager. **C. Wendell Beck** was named assistant general manager, Pfaudler Div. **Claude Birch**, a Pfaudler vice president, was named vice president in charge of manufacturing policy. **H. I. Edwards**, Pfaudler general sales manager, becomes director of sales policy for Pfaud-

HARRY H. NORTHRUP

ROBERT P. CARPENTER

managers of Republic steel plants

AXEL A. TALLQUIST

A. F. EDERER

Ederer Engineering executives

ler Permutit. **A. L. Gray** was made Pfaudler sales manager.

Republic Steel Corp. appointed **Harry H. Northrup** manager of the Chicago steel plant to succeed the late **C. P. Cutler.** He is succeeded as manager of the Buffalo steel plant by **Robert P. Carpenter,** former superintendent, Massillon, Ohio, steel plant.

Alvin J. Scheel was made general superintendent of the Fairless Works, Fairless Hills, Pa., of **National Tube Div.,** U. S. Steel Corp. He succeeds **Thomas C. Beattie,** retired.

William C. Schumacher, former vice president and executive head, motor truck division, **International Harvester Co.,** Chicago, was elected an executive vice president.

In the warehouse division of **Jones & Laughlin Steel Corp.,** Indianapolis, **Charles A. Burke** fills the new post of division sales manager-flat rolled products. **S. H. Coddington** fills the new post of division manager of operations-flat rolled products. **Richard K. Dobbs** was made sales manager-flat rolled products, Indianapolis warehouse.

Robert S. Kinsey was made director of engineering at the Utica, N. Y., division of **Bendix Aviation Corp.** He also is responsible for operation of the air turbine test laboratory at the Eclipse-Pioneer Div., Teterboro, N. J.

Denis J. McDowell was made industrial manager, Milwaukee branch office, **Brown Instruments Div.,** Minneapolis-Honeywell Regulator Co. He succeeds **H. M. Twible,** resigned.

Axel A. Tallquist was elected president of **Ederer Engineering Co.,** Seattle, to succeed **A. F. Ederer,** now chairman. **John C. Ederer** was named vice president and general manager, with responsibility for sales policy.

Donald H. Hartmann was made assistant general manager, **Moto-Mower Div.,** Detroit Harvester Co., at Richmond, Ind. He was assistant to the president of the company at Detroit.

Aluminum Co. of America installed a new research facility at its Chicago Works for fundamental study of the diecasting process. It will function as a section of the Cleveland Research Div. of Alcoa Research Laboratories. **John H. Moorman,** chief metallurgist for Alcoa's Garwood, N. J., Works, was named head of the new facility and assistant chief of the Cleveland Research Div.

C. A. Purbaugh was appointed Duluth district manager of operations for U. S. Steel Corp.'s **American Steel & Wire Div.** He succeeds **Harold Cope,** retired. Mr. Purbaugh was assistant district manager-operations at Duluth.

Link-Belt Co. appointed **Ralph C. McMillan** chief engineer of its Pershing Road plant; **David A. Davis,** chief engineer of its Caldwell plant, both in Chicago.

Lamson & Sessions Co. appointed **Louis Carlisle** sales representative to cover southern Ohio, West Virginia, and parts of Kentucky and Indiana. He is at Dayton, Ohio. **Joe Taddie** was assigned the northern Ohio territory, which includes part of Indiana. He is at Cleveland. **John R. McDonald,** manager of small screw sales, has also been assigned the supervision of Cleveland district sales.

Harold T. Bright was made manufacturing superintendent of the wire plant of **Sylvania Electric Products Inc.** at Warren, Pa. He was supervisor of production control of the plant.

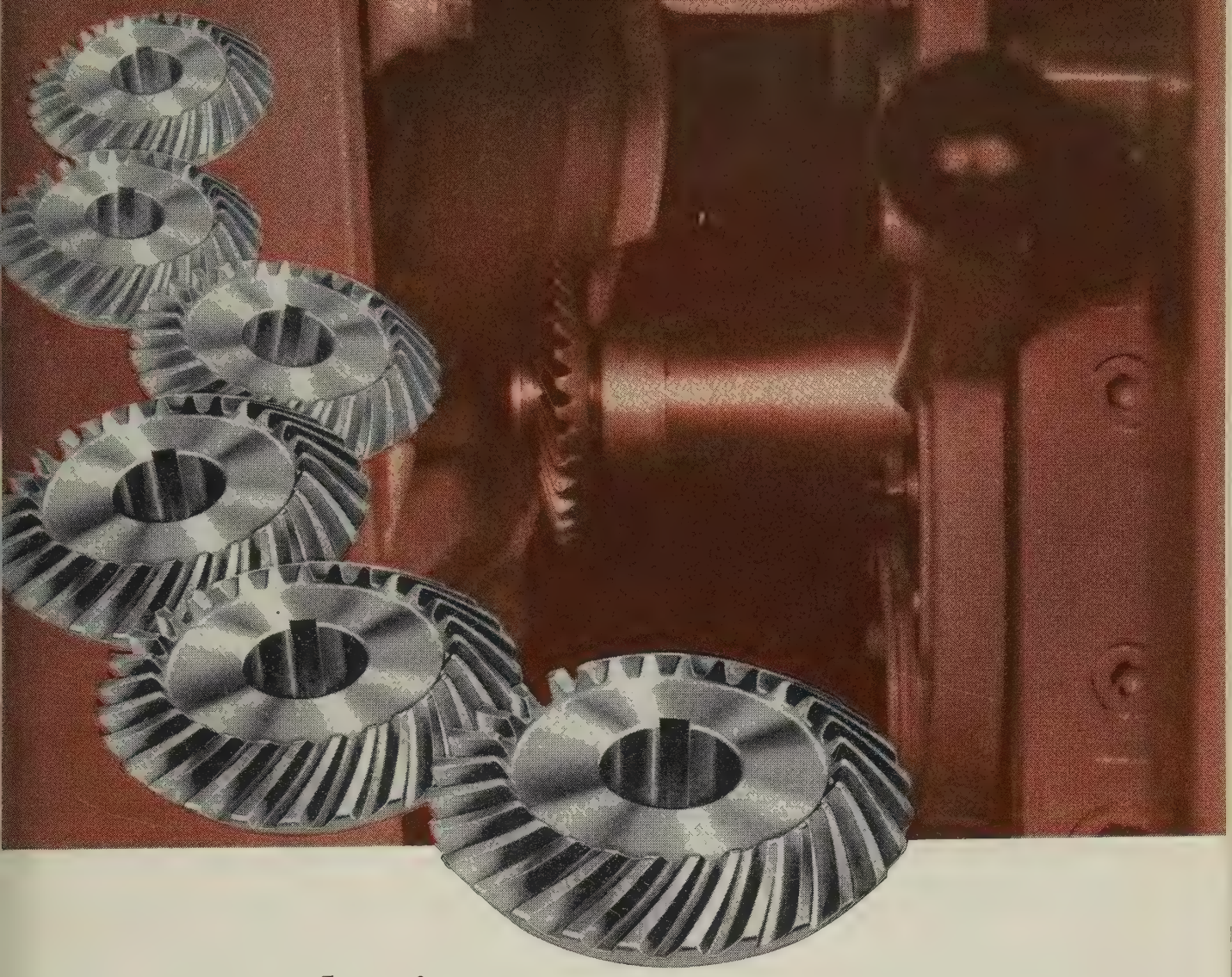
Republic Rubber Div., Lee Rubber & Tire Corp., created five new sales territories. New men and their headquarters are: **E. F. Kavanagh,** Baltimore; **L. B. Larson,** Charlotte, N. C.; **E. J. Leahy,** Kansas City, Mo.; **R. A. Willis,** Chicago. **H. R. Crytzer** moves from Cincinnati to Detroit; **R. D. Pearce** from Norfolk, Va., to Philadelphia; **S. P. Terlecky** from Philadelphia to Pittsburgh.

Monte L. Marks was made chief development engineer, analytical and control instruments division, **Consolidated Electrodynamics Corp.,** Pasadena, Calif.

At **Scranton Storage Battery Corp.,** Scranton, Pa., **Howard P. Greene** was named method and development manager; **Paul J. Lantolf,** production control manager; **W. Vincent Rothermel,** plant superintendent; **Michael V. Ferraro,** plant manager.

C. Harold Hannan was made senior application engineer at **Miniature Precision Bearings Inc.,** Keene, N. H.

Ralph R. Wyckoff joined **A. J. Gerrard & Co.,** Melrose Park, Ill., as sales promotion manager. He was



Get high-production precision gear grinding with this new machine!

You can now increase production and get the highest degree of accuracy and uniformity in medium to fine pitch gears with the new Gleason No. 7 Hypoid Grinder.

A completely automatic wet-type grinder produces gears with excellent finish and assures the ultimate in durability and in accuracy of transmitting motion.

A single lever controls operation of the hydraulic guard doors and chucking of the work. Change time for each piece is cut to a minimum.

Automatic in operation

Once the gear is chucked in the workhead, the operation is automatic. At preselected intervals, the grinding wheel is automatically dressed. When the gear is finished, the machine stops automatically.

Gears 20 DP and finer are ground directly from the solid. Coarser pitches are ground after semi-finish cutting and hardening. The automatic features of this grinder assure uniformity of all pieces ground, so that the gears are truly interchangeable.

The No. 7 Hypoid Grinder is easily set up and is ideal for small quantity or volume production.

More complete information on the Gleason No. 7 Hypoid Grinder will gladly be sent upon request.

The No. 7 grinds spiral bevel, Zerol® bevel, and hypoid gears up to 8½" diameter, 4 DP and finer.

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

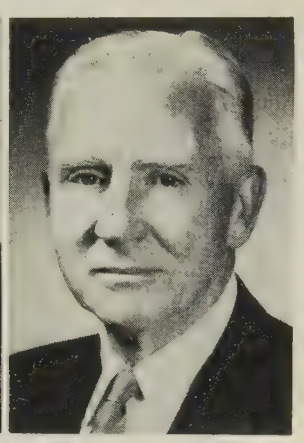
JAMES KING JR.
National Carbon electrode post

GERALD M. HENRIKSEN
Acoustica engineering dir.

BENJAMIN B. LORING
Seaporcel exec. v. p.

J. C. WHETZEL
U. S. Steel tin plate mgr.

ROBERT E. LYON
Precision Steel Warehouse post



THOMAS E. MOFFITT
Hooker Electrochemical pres.

formerly with Gerrard Steel Strapping Div., U. S. Steel Corp.

J. C. Whetzel was appointed manager of tin plate products for **United States Steel Corp.**, Pittsburgh, succeeding **George E. Totten**, retired. Mr. Whetzel was assistant manager.

Robert E. Lyon was made sales manager, manufacturing division, **Precision Steel Warehouse Inc.**, Downers Grove, Ill.

Vice President **Donald W. Koegle**, formerly manager, domestic farm machinery sales, **Oliver Corp.**, Chicago, was appointed general sales manager of the corporation. **Clyde A. Hart**, formerly central division regional manager, was made manager of domestic farm machinery sales, replacing Mr. Koegle. **William Cregan**, formerly Minneapolis branch manager, was named central division regional manager. **Henry Hesch** transfers from Waukesha, Wis., to replace Mr. Cregan at Minneapolis.

Thomas E. Moffitt was elected president, **Hooker Electrochemical Co.**, Niagara Falls, N. Y. He succeeds **Bjarne Klaussen**, retired. Mr. Moffitt was executive vice president. **Ansley Wilcox II**, secretary and general counsel, was elected a vice president. **Thomas F. Willers** was elected a vice president and treasurer, continuing as comptroller. **Dennis A. Riordan**, treasurer, retired.

Harold A. Muttach was made works manager, **Granite City Steel Co.**, Granite City, Ill. He is succeeded by **Frank J. Burgert** as division superintendent of coke ovens, blast furnaces, open hearths, and foundry. **Joseph F. Tepolt** was made superintendent, cold strip department.

Alex E. Ainlay was made western regional manager, **Pettibone Mulliken Corp.**, with headquarters in San Francisco. **Clem C. Persily** was made midwest regional manager, with headquarters in Chicago.

James King Jr. was named sales manager, electrode products, **National Carbon Co.**, a division of Union Carbide Corp. Former central division manager, electrode product sales, in Chicago, he is now in New York. **John M. Schreiner** was named to the Chicago post and is succeeded in San Francisco as Pacific division manager by **M. M. Rand.**

Gerald M. Henriksen was made director of engineering at **Acoustica Associates Inc.**, Mineola, N. Y. He recently resigned as research and engineering director, turbo division, American Machine & Foundry Co.

Benjamin B. Loring, vice president, was made executive vice president and treasurer, **Seaporcel Metals Inc.**, Long Island City, N. Y.

OBITUARIES...

William K. Stamets, 74, president and founder, **Wm. K. Stamets Co.**, Pittsburgh, and **Enterprise Co.**, Columbiana, Ohio, died Nov. 17.

John H. Vohr, 64, general superintendent, Gary, Ind., Works, **U. S. Steel Corp.**, died Dec. 1.

Arthur J. Benner, 63, assistant to the president, **Allen-Bradley Co.**, Milwaukee, died Nov. 24.

Harry A. Johnson, 66, purchasing agent, **Gemmer Mfg. Co.**, Detroit, died Nov. 23.

Charles R. Ellicott, 77, retired vice president, **Westinghouse Air Brake Co.**, died Nov. 24 in Glen Ridge, N. J.

Guy N. Harcourt, 68, retired vice president - engineering, **Buflovak Equipment Div.**, Blaw-Knox Co., Buffalo, died Nov. 20.

Edward A. Halbleib, 75, retired general manager, **Delco Appliance Div.**, General Motors Corp., Rochester, N. Y., died Nov. 19.

Emil Rougraff, 71, vice president-production, **Thomas Machine Mfg. Co.**, Pittsburgh, died Nov. 23.

Cecil Farrow, 59, consulting engineer at **Republic Steel Corp.'s** electrical laboratory, Cleveland, died Nov. 22.

Three Steel Firms Plan To Consolidate

Empire Steel Corp. will merge with Reeves Steel & Mfg. Co. to form Empire-Reeves Steel Corp. It'll operate as a wholly owned subsidiary of Universal-Cyclops Steel Corp.

UNIVERSAL - CYCLOPS Steel Corp., Bridgeville, Pa., Empire Steel Corp., Mansfield, Ohio, and Reeves Steel & Mfg. Co., Dover, Ohio, will consolidate, subject to approval of stockholders (STEEL, Dec. 2, p. 48).

The plan is unique. Empire Steel will merge with Reeves Steel to form Empire-Reeves Steel Corp. It, in turn, will operate the Mansfield and Dover plants as a wholly owned subsidiary of Universal-Cyclops Steel Corp.

Officials — Empire-Reeves Steel Corp. will be headed by Donald W. Frease as president and general manager. He has been elected a vice president of Universal-Cyclops (effective immediately).

Other principal officers of Empire-Reeves will be: A. J. Krantz, chairman; S. J. Reeves, executive vice president; and D. D. Hattman, vice president and assistant general manager.

Products—Universal-Cyclops is a producer of tool steels, stainless steels, high temperature metals, refractory metals, and specialty steels. It operates plants at Bridgeville and Titusville, Pa., and is constructing a stainless strip mill at Coshocton, Ohio.

Empire Steel produces hot and cold rolled carbon and silicon strip and sheets, long terne sheets, oxide coated sheets, carbon plates, and heavy stampings. The firm has an annual open-hearth capacity of 500,000 ingot tons at Mansfield. It has been the principal supplier of semifinished steel for Reeves.

Reeves Steel & Mfg. Co. has a substantial financial interest in Empire Steel. It is a producer of continuous galvanized steel sheets, roofing, and siding, and it fabricates a broad line of spouting, metalware, and other metal products.

Benefits—Universal-Cyclops will utilize the excess blooming and hot strip rolling capacity at the Empire plant to meet the requirements of its expanded stainless steel production program, particularly for the needs of its cold rolling operation at Coshocton. For Empire and Reeves, the move provides diversification in the use of their facilities and a broader base for growth and earnings.

Combined sales of the companies in 1956 were $112,417,051; net income, $6,707,189. For the nine months ended Sept. 30, 1957, their combined net income was $3,129,960. Assets of the new company will be more than $65 million.

Chrysler Lets Contracts

Chrysler Corp., Detroit, has awarded primary contracts for the design, engineering, and construction of a 1.3 million sq-ft assembly plant on U. S. Highway 66, southwest of St. Louis. The project is contingent upon the rezoning of the plant site for industrial use. Awards went to Sverdrup & Parcel, St. Louis, architectural engineers for the design of the administration building; Albert Kahn Associated Architects & Engineers, Detroit, for the design of the assembly building, powerhouse, and related manufacturing facilities; H. D. Tousley, Indianapolis, general contract for the construction of the manufacturing building. Tousley will open St. Louis offices and will take bids for subcontract work. The manufacturing building will have a structural steel frame and precast concrete walls. The 65,000 sq-ft administration building will be constructed of reinforced concrete.

Forms Electronics Division

Mack Trucks Inc., Plainfield, N. J., is combining its electronic research and manufacturing facilities into a single division, Mack Electronics Div. This will permit greater co-ordination of work in the aircraft, missile, and rocket fields. The company's electronic manufacturing operations were done by Mack Electronics Div. Inc., a wholly owned subsidiary; re-

(*Please turn to Page* 145)

DU PONT
REG. U. S. PAT. OFF

PRODUCT NEWS

New Du Pont cost-analysis method helps you save money two ways

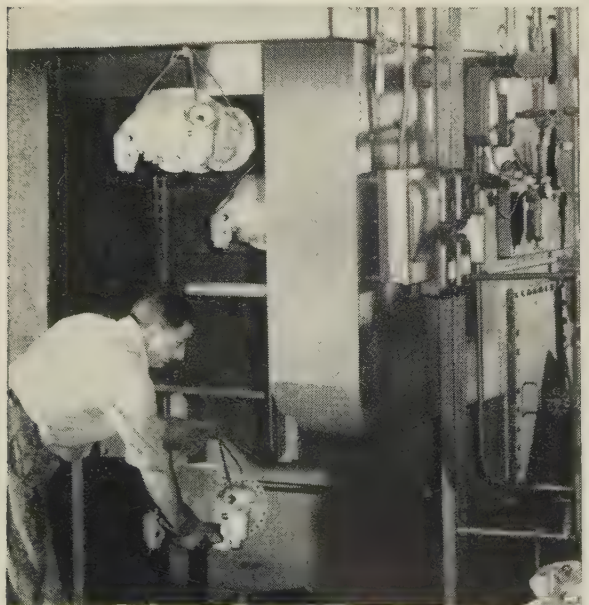
• Du Pont's exclusive cost-analysis method can help you cut cleaning costs or help you choose the best cleaning process for your needs. This new service is now available at no cost or obligation. Check coupon for more details.

Du Pont and its distributors of Triclene® D trichlorethylene now offer an accurate method for analyzing all costs involved in metal cleaning. This new Du Pont service can save you money by helping you (1) determine where present cleaning costs can be cut, or (2) choose the most efficient cleaning process if you're expanding or planning a new installation.

Du Pont's exclusive cost-analysis method combines 25 years of metal-cleaning experience with proven cost-accounting procedures. The result is a simplified and thoroughly reliable way to compare all costs of various cleaning processes or of alternate methods of handling your present cleaning operation.

Du Pont's cost analysis gives you a *complete* cost picture and doesn't stop with the obvious, and usually misleading, cost factors such as equipment, solvent or chemicals. You'll be able to answer any question about your cleaning costs confidently and instantly spot those that are out of line.

Du Pont, or its distributors of "Triclene" D, will be glad to give you full details. Whether it's cutting costs, improving your present cleaning results or trying to decide which cleaning process is best for you—you can get accurate answers using Du Pont's proven cost-analysis method. Use the coupon for prompt attention.



• Conveyorized vapor-degreasing unit cleans oil, grease and chips from machined aircraft cylinders.

Why vapor degreasing with TRICLENE® is ideal for assembly-line cleaning

It's fast —Vapor degreasing with "Triclene" D removes grease, oil, cutting compounds and other contaminants—usually in less than a minute!

It's thorough —Vapor degreasing with "Triclene" D leaves parts clean and dry—instantly ready for the next operation; never causes etching or staining—leaves no deposits of any kind.

It's versatile —Vapor degreasing with "Triclene" D will clean parts made of all common metals and alloys, in any size or shape.

It's economical —Vapor-degreasing equipment is compact and inexpensive to install. Parts come out dry, eliminating need for dryers —saves valuable floor space. You'll find that the superior cleaning action of "Triclene" D eliminates rejects, cuts downtime.

It's easy to operate —Anyone can do it. In fact, vapor degreasers can be run automatically. Du Pont will be glad to provide instructions for proper operation of your vapor degreasers if you wish.

▶ If you would like to know more about degreasing, or want to be sure you're getting the most efficient cleaning from your present degreaser, call your Du Pont "Triclene" D distributor. If needed, he can call in one of Du Pont's metal-cleaning experts. You can also contact any Du Pont district sales office or use the coupon at right.

(*Concluded from Page* 141)

search and development activities were conducted by Mack Electronics of Boston, a separate company division. Robert Edwards has been named general manager of the new division; Glen H. Roundy, director of sales; and Paul Travers, director of engineering.

Buys Sutherland's Business

Black-Clawson Co. has acquired the refiner, breaker trap, and pressure washer business of Sutherland Refiner Corp., Trenton, N. J., in the U. S., Canada, and certain overseas markets. Black-Clawson, which makes pulp, paper, and converting machinery, will center the sales and servicing of the Sutherland line in the Shartle Div., Middletown, Ohio; Pandia Div., Hamilton, Ohio; and Black-Clawson (Canada) Ltd., Montreal, Que.

Hammel-Dahl To Expand

Hammel-Dahl Co., Warwick, R. I., manufacturer of control devices, plans to produce components for missiles following its forthcoming merger with General Controls Co., Glendale, Calif. Plans call for a $1-million building program to be launched in 1958, adding 100,000 sq ft of space to Hammel-Dahl's facilities in Warwick.

Atlas Combines Sections

Atlas Powder Co., Wilmington, Del., will consolidate its Parke Thompson Ordnance Sec., now in St. Louis, with the Military Detonator Sec. at its Reynolds plant near Tamaqua, Pa. The firm also established a Toxicology Sec. in its Chemical Research Dept. to carry out research on the safety of Atlas products from the standpoint of handling, use, and consumption.

Heil-Quaker Corp. Formed

Heil Co.'s Heating & Air Conditioning Div. is being transferred from Milwaukee to Lewisburg, Tenn. The division was sold to a new firm, Heil-Quaker Corp., owned jointly by Heil Co. and Sears, Roebuck & Co., Chicago. Heil-Quaker also purchased from Florence Stove Co. its Lewisburg

plant and its Quaker line of space heaters. Heil-Quaker officials include: President, C. W. Milligan; vice president, G. E. Hochstein; and secretary, E. R. Martin.

GM Building in South

General Motors Corp., Detroit, awarded a contract to Daniel Construction Co., Birmingham, for erection of a warehouse and office building in the Irondale Industrial Park, Birmingham. Work is scheduled to begin about Jan. 1 with completion in about six months.

Opens Laboratory

Raytheon Mfg. Co., Waltham, Mass., dedicated its 42,000 sq-ft electronic laboratory at Santa Barbara, Calif. It will be operated by the Government Equipment Div. and will perform advance engineering and development work in such areas as infrared, countermeasures, communications, and radar.

Enters Warehousing Field

Blasdell Steel Warehouse Corp., a new firm specializing in steel storage and metal pickling, has completed its plant on Electric Avenue, Blasdell, N. Y. Cost of plant and equipment: About $350,000. Philip Verel is president.

AP Parts Sells Division

AP Parts Corp., Toledo, Ohio, sold its Miracle Power Div. to the Miracle Power Products Corp., 1101 Belt Line St., Cleveland, Ohio. This newly formed organization is connected with the Eveready Pressurized Products Inc., Cleveland.

Forms General Vacuum

General Vacuum Corp. has been organized. Its officers are: President, W. G. Overacker; vice president, D. J. Tobin; and treasurer, R. A. Knight. The firm's 25,000 sq-ft plant is at 400 Border St., East Boston, Mass. The company will concentrate on engineering, development, testing, and sales. Artisan Metal Products Inc., Waltham, Mass., will fabricate high vacuum equipment to General's design. The new company will also concentrate on developing an im-

roved line of pilot-plant induction nd arc melting vacuum furnaces.

CONSOLIDATIONS

Beckman Instruments Inc., Fullerton, Calif., acquired **Arnold O. Beckman Inc.,** South Pasadena, Calif., manufacturer of oxygen analyzers.

H & B American Machine Co. Inc., Chicago, purchased **Big Boy Mfg. Co.,** Los Angeles, through its subsidiary, Seidelhuber Steel Rolling Mills, Seattle.

NEW PLANTS

Metal components for electrical transmission towers and electrical switchboard units are rolling from the production line of **Anchor Metals Inc.'s** new plant at Ft. Madison, Iowa. Clyde Mooney of Ft. Worth, Tex., is president of the firm.

Day-Brite Lighting Inc. of California, a subsidiary of Day-Brite Lighting Inc., St. Louis, plans to build a plant in Sunnyvale, Calif., for the manufacture of lighting fixtures.

NEW OFFICES

Wales-Strippit Co., North Tonawanda, N. Y., opened an office at 537 E. Delavan Ave., Buffalo, for its Eastern Div. William A. Schrader has been named divisional manager. The firm manufactures tooling and machines for punching and notching. Wales-Strippit is a unit of Houdaille Industries Inc.

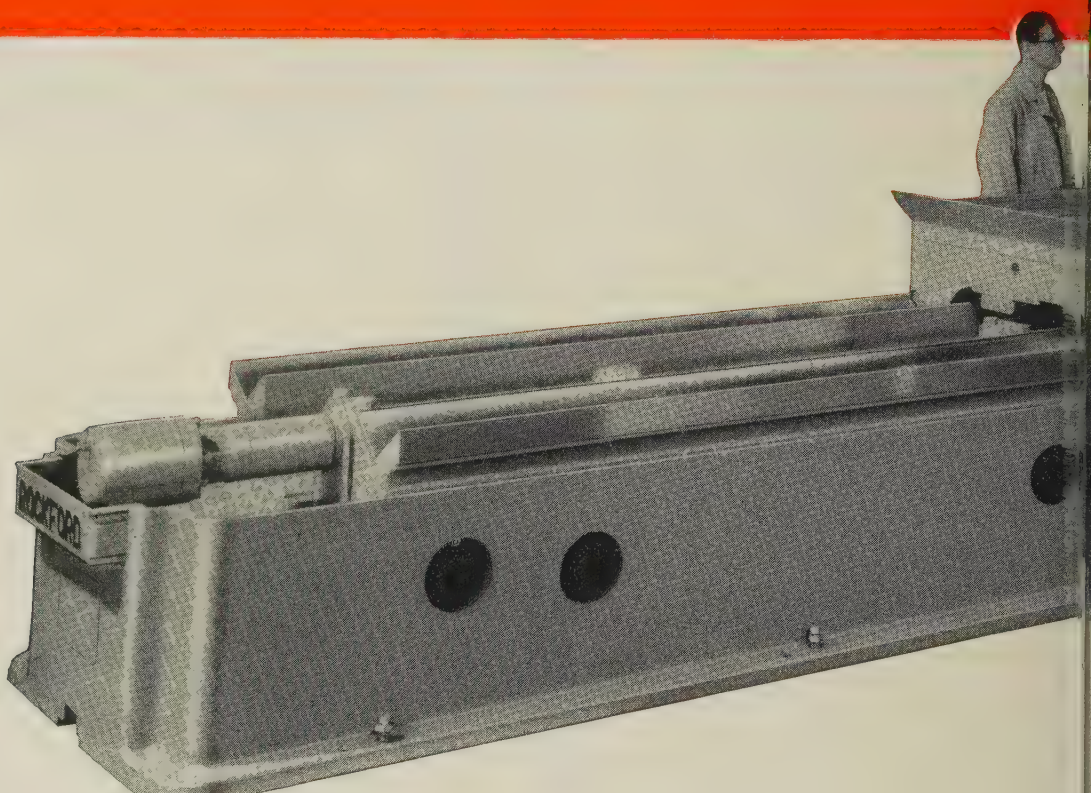
Fischer & Porter Co. moved into its new office building at 463 Jacksonville Rd., Hatboro, Pa. The 50,000 sq-ft structure adjoins the firm's plant.

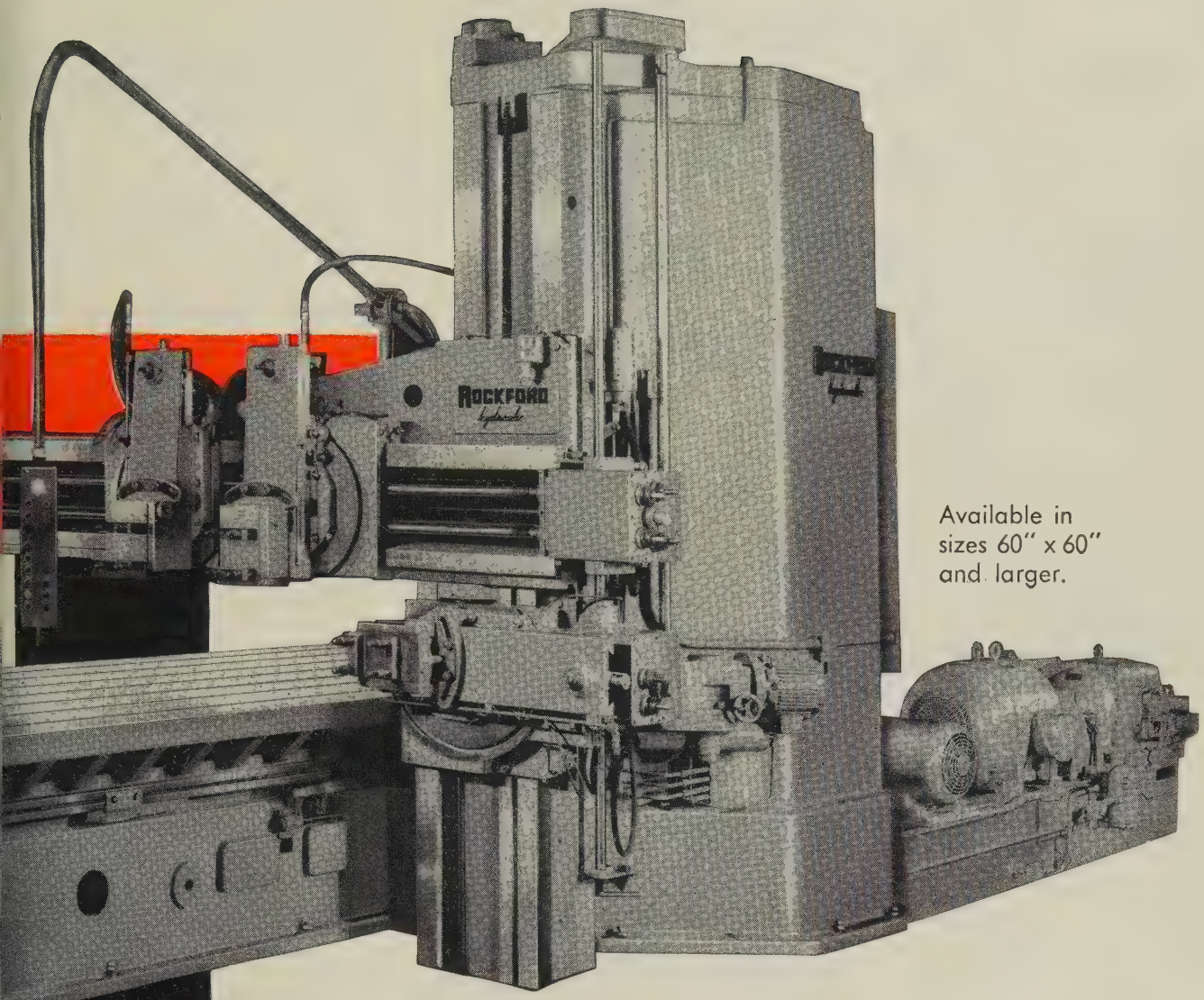
American Blower Div. of American-Standard, Detroit, opened a branch office at Amarillo, Tex. The facility will provide sales engineering assistance to users of air handling, heating and air conditioning

(*Please turn to Page* 152)

2-speed traverse motors eliminate manual positioning in set-up on

new Rockford Hydraulic Planer





Available in sizes 60" x 60" and larger.

complete pendant control speeds operation and set-up

All feed and traverse movements are selected and operated from the push button station of this new Rockford hydraulic planer. Two-speed traverse motors — high speed for approximate positioning, and slow speed for extremely close power positioning of rail and side heads — eliminate the need for manual positioning in setting-up for a job.

Extra-rugged construction affords use of most modern cutting tools and cutting techniques. The machine is equipped with the new high speed h3 triple circuit.

Get full details on the wide production flexibility of this new hydraulic planer from any Rockford Machine Tool Co. representative, or write directly to us.

h HYDRAULIC

ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

(*Concluded from Page* 149)

equipment, fluid drive power transmission units, and refrigerating machines. F. L. Matthews has been named manager.

ASSOCIATIONS

The Pittsburgh chapter of the **Institute of Scrap Iron & Steel Inc.**, Washington, elected these officers: President, Albert I. Monheim, Louis Berkman Co.; first vice president, Morris Hartman, Allied Iron & Steel Co.; second vice president, R. H. Burstein, Burstein Co.; secretary, Albert Stern, Luria Bros. & Co. Inc.; and treasurer, Carl Teaman, Joseph Hurwitz Co.

John D. Clemens, Hays Mfg. Co., Erie, Pa., is the new president of the **Plumbing Brass Institute**, Pittsburgh. Other officers are: First vice president, J. H. Pimm, Bridgeport Brass Co., Bridgeport, Conn.; second vice president, Roger Milroy, Lee Bros. Foundry Co., Inc., Anniston, Ala.; treasurer, G. C. Harper, Burlington Brass Works, Burlington, Wis. Hanson & Shea Inc., Pittsburgh, was retained as executive secretary of the institute.

Don H. Malcom, Armco Drainage & Metal Products Inc., Middletown, Ohio, has been named to head the **Metal Building Manufacturers' Association.**

NEW ADDRESSES

Gibson Electric Co., producer of electrical contacts, moved its manufacturing facilities and offices to its new plant on Old William Penn Highway, Delmont, Pa.

L. B. Foster Co., Pittsburgh, moved its Los Angeles offices to 3540 Wilshire Blvd. The firm is a national supplier of steel sheet piling, pipe, rail, track accessories and highway products.

Fischer & Porter Co., Hatboro, Pa., relocated its Chicago branch at 1205 S. Eighth Ave., Maywood, Ill. The company makes complete process instrumentation systems

Technical Outlook

MEASURES QUENCHING SPEED— A small, portable device that can be used in any heat treating shop has been developed by the General Motors Process Development Section (Detroit) to check the quenching effectiveness of oils, water, or brines. Called a Quenchometer by GM, it was demonstrated by E. F. Houghton & Co. at the National Metal Exposition in Chicago last month. (Details of operation and metallurgical significance of the test will be presented in a feature article in STEEL later this month.)

DEGASSING ZOOMS—Vacuum degassing is coming into its own, says K. C. Taylor, manager, Degassing Systems Div. of F. J. Stokes Corp., Philadelphia. He predicts vacuum stream degassing capacity of 10,000 tons per month by mid-1958. Present degassing capacity is listed this way by him: Induction melting, 850 tons per month; consumable electrode melting, 2500 tons per month; vacuum stream degassing, 3000 tons per month.

ANOTHER INSTALLATION—Newest convert to vacuum stream degassing is Erie Forge & Steel Corp., Erie, Pa. The dual chamber system will be built by F. J. Stokes Corp., Philadelphia. The company says it will use degassing with its electric and open-hearth furnaces to produce "high quality steel ingots, steam turbine rotors, generator rotors, and other products to meet today's exacting requirements."

LEADED STEELS STUDIED— There is no difference between the fatigue strengths of leaded and nonleaded steels having ultimate strengths below 130,000 psi, states a report to the Bureau of Ordnance, U. S. Navy. Investigation by G. W. Brock and G. M. Sinclair, University of Illinois, shows that above 130,000 psi the fatigue strength of leaded steel declines. The study included tensile and fatigue properties of leaded SAE 1018, 1045, 8620, and 4340 alloys. Tensile tests showed that 0.2 per cent lead had no effect on mechanical properties, while possible drops in fatigue strength were about 8 per cent at 170,000 psi and 16 per cent at 275,000 psi. In notched samples, there was practically no difference between fatigue strengths of leaded and nonleaded steels in the tensile strength range of 70,000 to 170,000—little difference at 275,000 psi.

CORRELATIONS—The British Iron & Steel Research Association has used an electronic computer to analyze operating data from seven blast furnaces covering a six-year period. Some of the correlations obtained: 1. An increase of 212° F (100° C) in blast temperature brings a decrease in the coke rate of 40 lb per short ton of iron. 2. Coke rate goes down 70 lb per ton each time sinter is increased 10 per cent. 3. An increase of 1 per cent silicon in the metal results in a 120 lb per ton increase in coke rate.

REACTION RATES— The National Bureau of Standards has developed a technique for measuring the rate at which a solid surface is attacked by a corrosive gas. It uses time-lapse photography of the reacting solid so that a permanent record of the reactor's progress is obtained at specified time intervals.

COATINGS— Three developments in coatings have emerged from the British Iron & Steel Research Association's laboratories at Swansea, South Wales: 1. Plasteel, a polyvinyl chloride laminate for steel strip which shows no adhesion failure on deep-drawn parts after an hour's immersion in boiling water. 2. A roller-coating process for continuous hot tinning of strip which may also be applicable to zinc and aluminum coatings. 3. A dulling process to mark the thick or thin side of differentially coated tin plate, which does not impair the quality of the plate.

Operator starts analysis. Device on table holds crystal, measures diffraction angles of x-rays from sample. Angle identifies elements; intensity measures quantity

A Way To Speed Analysis

Foundry uses x-ray spectrometer to analyze heats in one-tenth the time formerly required. Control is said to be within 0.03 per cent. Samples can be powdered, solid, or liquid

GENERAL Electric's foundry at Schenectady, N. Y., can complete a quantitative or qualitative analysis of a complex alloy in one-tenth the time it takes most steel producers.

Its success is due to a new device called an x-ray emission spectrometer (XRD-5). Here are some things GE says it can do:

- In 30 seconds, it can determine the percentage of an element in a metal sample.
- It can complete an analysis of stainless steels like AISI 316 or 347 in a few minutes.
- The device operates equally well with solid, powder, or liqui samples.

Increases Production—GE's la used to take more than 2½ man hours to run a chemical analysis of elements in carbon and low a loy steels. With the spectrometer the job is completed in only 3 manminutes.

Before the new equipment wa available, a GE chemist worke overtime to complete 185 analyse a week. With the emission tech nique, he runs 435 in 10 per cen less time.

How It Works—A solid, powde or liquid sample is placed in lin with a strong x-ray source. Ion zation of the atoms causes emis sion of secondary x-rays whic have characteristics peculiar t each element.

Secondary rays are channeled t an analyzing crystal. It disperse or spreads out the several charac teristic wave lengths of each ele ment. (The crystal behaves as three-dimensional diffraction gra ing.)

Qualitative Measurement — A opposed to diffractometry, the dis tance between the crystal's atomi planes is known. A device calle a spectrogoniometer (see illustra tion) turns the crystal. Peaks c x-ray intensities at various angle are recorded on a chart. The op erator can identify elements b correlating the peak angles with chart (it also provides a direc reading of wave length).

Quantitative Analysis — Th spectrometer normally is set t the diffraction peak of the elemen to be measured. The intensity c observed radiation is proportiona to the concentration of the ele ment.

A counting tube (detector) i the spectrogoniometer converts ra diation into impulses which ar counted for a preset time. Precis analysis is related to the numbe of counts per second.

Accuracy—GE says it has bee able to control chemical variation in heats, particularly the percent age of chrome and manganese, t within 0.03 per cent.

The firm also feels that the in strument will eventually be wide ly used for slag analysis and con trol, incoming material acceptance and to check sand contaminatio and reclamation.

Method produces parts

that can't be made any other way.

Machinemakers point to

simplicity, low initial cost.

Keep your eye on

assembly applications

production ideas
NO. 16 OF A SERIES

Swagers Point, Form, Assemble

A MAJOR midwestern producer used to broach the inside of auto shock absorbers. Tool cost was high; surface finish, although satisfactory, needed improvement.

Today, the firm swages them. Tool costs are reduced, and even more important, the surface has an unlooked for extra: Tiny, almost immeasurable, indentations hold oil, adding greatly to the life of the device.

Features—That's one example of how rotary swaging fits today's trend toward chipless partmaking. Consider these advantages:

1. It's inexpensive. Machinemakers point to the low initial cost of equipment.

2. It moves large amounts of metal in a short time with practically no waste.

3. Labor costs are low. (One unskilled operator can efficiently serve several machines.)

4. It improves physical properties. Performed cold, it imparts a fine surface finish, a high degree of dimensional accuracy, and a better grain structure.

Case History — Engineers at Winchester Western Div., Olin Mathieson Corp. New Haven, Conn., like the economy angle. Robert McMahon, production engineering manager, says his department usually checks swaging before considering other methods.

The firing pin (Page 158) is an example. It was a screw machine product. Toolmarks (they're stress raisers) made for a high breakage rate. Swaging reduced costs more than 40 per cent.

What It Is—A ductile metal bar, tube, or blank is shaped in a rotating, closed die. It's a process of reduction which originated in the blacksmith shop and is closely related to forging.

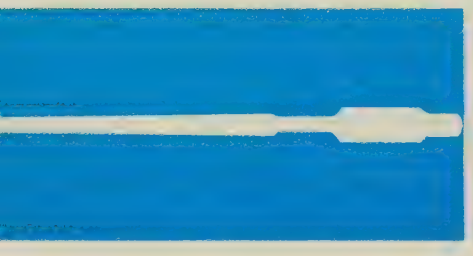
Most operators prefer to do it cold. Surface finish is better than that produced by hot swaging since there is no scale; tensile strength is also higher.

Blanks can be round, square, oval, or hex-shaped. Finished

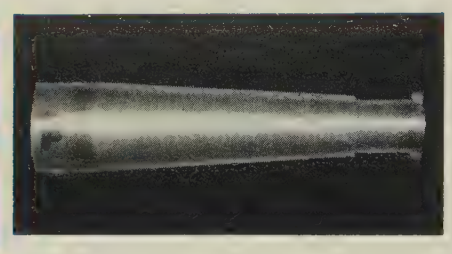
Partmakers, designers should consider swaging for:

- **Long production runs—**
  But method isn't economical for a wide variety of parts.
- **When parts can't be made any other way—**
  Ball joints for automobile front suspensions are one example. Swaged stainless tubing is particularly suited for dairies and soft drink vending machines. Interiors are smooth; there are no pits or crevices to promote corrosion or harbor bacteria.
- **Long tapers in tubes with thin or varying wall thicknesses—**
  Furniture makers restyled straight, unadorned table and chair legs by tapering. New machines will handle tapers 16 in. long.
- **Tube closures—**
  Metal bottlemaker (Kidde Mfg. Co., Bloomfield, N. J.) uses it for high pressure applications. Hot swaging welds ends tightly.

Internal threading



This is the firing pin which Winchester Western swages. When it was made entirely by automatic screw machine, the firm was plagued with failures caused by tool marks



This spindle for an aircraft landing gear is rotary swaged hot at Ohio Seamless Tube Div., Copperweld Steel Co., Shelby, Ohio. Elimination of rough machining saved 37 per cent

shapes generally are round, although an unlimited variety of diameters or forms can be made along the length of the blank. (One manufacturer uses swaging to form flats, squares, and hexes on each end of the round bars. It has advantages over machining the round portion on shaped bars.)

Mandrels extend the usefulness of the process to inside surfaces of cylinders. Contours, threads, and bosses are an everyday practice. One firm, (Torrington Co., Torrington, Conn.) has perfected a method of accurately swaging a series of varying diameters into the inside of cylinders.

The photo on Page 159 shows the heart of the rotary swager. A ring of rollers surrounds the dies and contacts the hammers as they revolve. Centrifugal force keeps the dies open between blows. The smaller machines can deliver as many as 3750 blows a minute.

Versatility—You can use swaging for pointing, forming, and assembly.

Much of the pointing is done on tubes or bars which will be sized or drawn at mills. Other examples: Spindles for machines, scribers, punches, and meat hooks.

Forming—Swaging really shines here. The auto shock absorber (Page 157) is the outstanding example. Steel shafts for printing presses are another. Some shafts are made by turning down a bar. By using a smaller blank and swaging both ends, one firm saves 37 per cent of its material. Bearing diameters are within plus or minus 0.001 in.

Many of the ball ends on tierods for auto suspension systems are swaged by Gemmer Mfg. Co., Detroit.

Ford Motor Co., Detroit, swages many of its parts, including the ends of exhaust fittings.

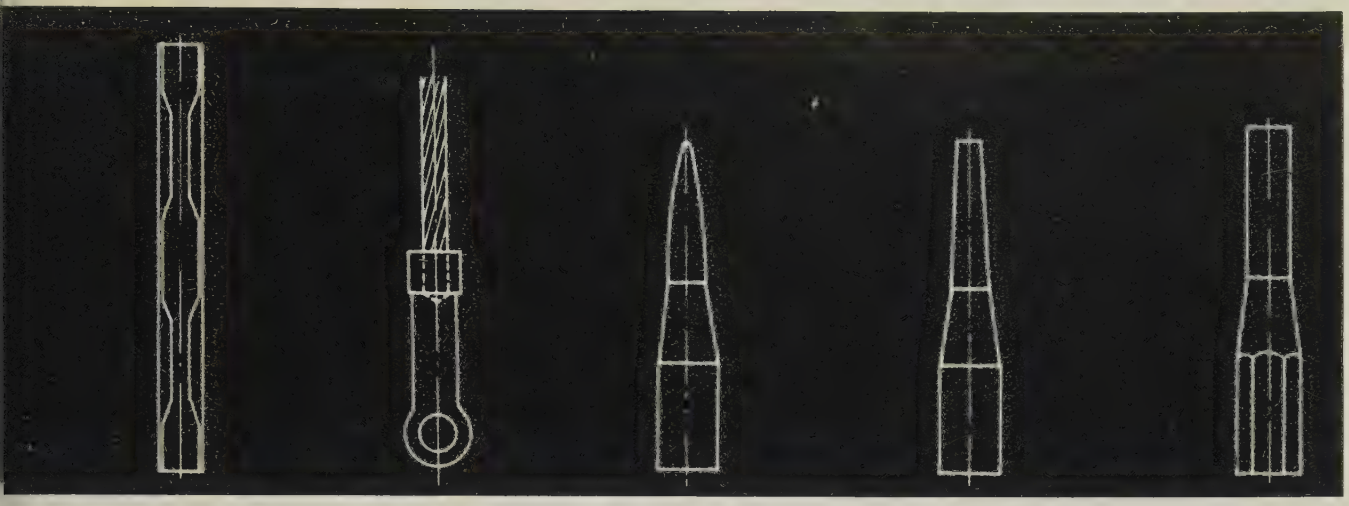
Joining and Assembly — Parts for atomic reactors are swaged. Pure aluminum (1100) and zirconium are assembled with uranium fuel rods. The method helps insure a tight contact between fuel and can.

Several parts can be joined by a swaged sleeve or ring. Cable ends are good examples. One firm covers a braided wire with a circular winding of soft wire, swaging the entire length. The result is a smooth, wear-resistant exterior covering a tough, flexible core.

Dow Chemical Co., Midland, Mich., produces steel pipe lined with Saran, a chemically resistant plastic. Extruded plastic tubes are placed inside sections of steel pipe. Swaging reduces the diameter of the pipe, locking the lining tightly in place.

Machines—Fenn Mfg. Co., Newington, Conn., has a device which permits larger than normal die openings. Called a Hydroformer, it incorporates wedges in the spin-

Six Basic Ways to Use Swaging



Internal forming | Assembly | Pointing | Tapering | Straight reduction

Source: Torrington Co., Torrington, Conn.

dle to permit the insertion of work for swaging between shoulders. It is sometimes called internal or central swaging. Typical examples: Ball fittings on cables, step necking, and swaging ball ends on a tube.

Other makers of swagers offer similar devices, calling them die closing attachments.

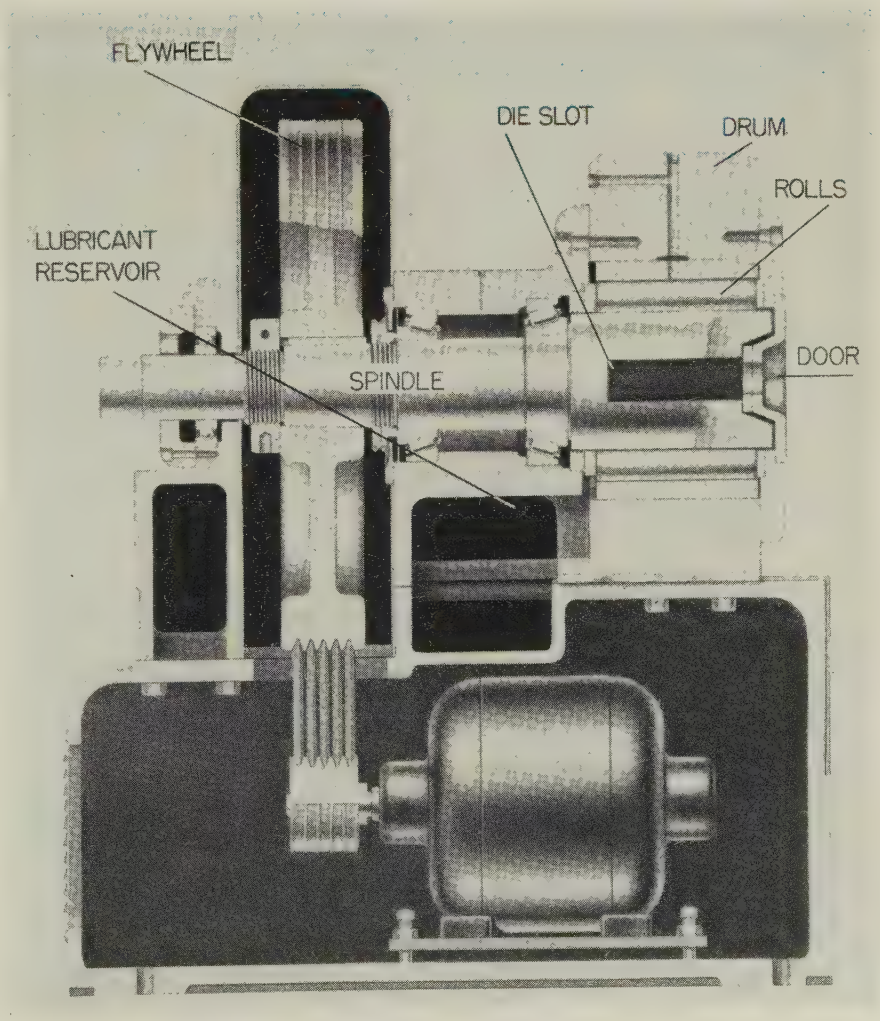
Machines — Today's equipment will handle rods as small as 0.015 in. in diameter and tubes as large as 6 in. (Abbey Etna Co., Perrysburg, Ohio, is making a larger one for Dow Chemical Co. It will handle 9-in. plastic lined pipe, with about a 9.75-in. OD.)

Except for proprietary variations, most swaging machines look alike. Main differences are the location of flywheels and bearings and the number and mounting of rollers.

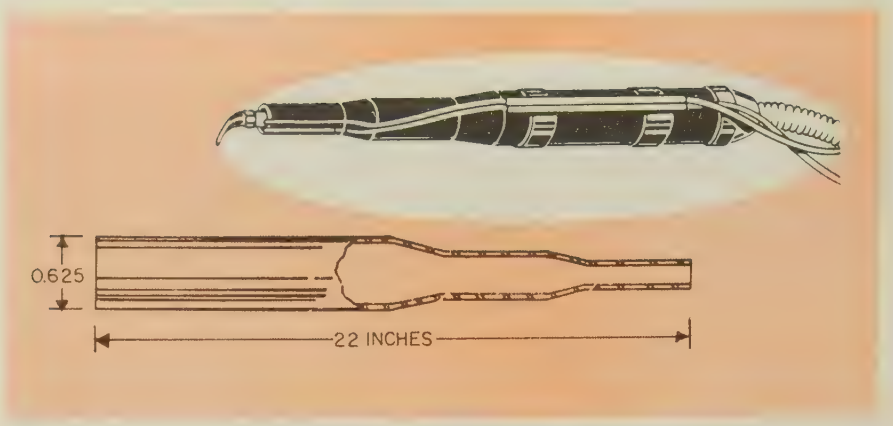
Some machines carry the rollers loosely in a cage, producing a planetary effect. Others prefer a fixed type; one maker uses no cage at all.

Hammers have a flat face in contact with the dies and a rounded end next to the rollers. They are assembled in the spindle with the dies.

A disc or faceplate holds the rolls in place. Spindles are hollow to permit insertion of work. A door or plate holds the dies in



Here is a typical rotary swaging machine in cross section. (Maker: Abbey Etna Co., Perrysburg, Ohio.) Combination of rolls and dies in spindle provides hammering action



Swaging Cuts Costs 80 Per Cent

THE gadget in the illustration is an ultrasonic dental drill made by Sheffield Corp., a division of Bendix Aviation Corp., Dayton, Ohio.

The housing (in color) holds a precision electromagnetic transformer and a mechanical amplifier. Even slight variations in housing dimensions greatly reduce efficiency.

The tool, called a Cavitron, used to be made from two machined pieces joined by silver brazing. Heat distortion caused many rejects.

Today, the housing is swaged from a piece of tubing.

Results: 1. The housing costs 80 per cent less. 2. There is no waste material. 3. The part is stronger than the machined assembly. 4. The smooth, bright surface requires no additional finishing.

the spindle. Slots for dies and hammers are similar in both two and four die machines.

Two Kinds — You can use two or four die types. Many swagers can be adapted for both. The main differences between them: With four dies, work reduction is faster and greater; there is less bearing surface and more direct hammering pressure from the rolls. The pressure on each roll is somewhat less, which makes for longer life under heavier loads. There is also less chance for split dies in heavy reductions. Another advantage: Less twist when working a coil of stock.

The two-die machines are more widely used because of the improved finish they impart.

Combat Heat—Cooling systems are available as optional equipment for most machines. Some engineers like to do large work cold; coolants are essential for hot work. (There are some engineers who dislike coolants. They feel that work hardening of rolls and hammers in large machines is relieved by heat.)

An oil tank and a gear pump are adequate when the job requires a lubricant. One machinemaker recommends a mixture of kerosine and machine oil.

Dies Important—Torrington Co., Torrington, Conn., is one of the leading makers of swagers. It employs more than 1000 machines in its general manufacturing. The firm's engineers place great emphasis on die design and maintain that the machine is a secondary consideration.

Die materials vary widely, although high carbon steels work well. For longer life, most makers recommend high speed die steels. Some users turn to carbide dies for the extremely hot, tough jobs like tungsten and molybdenum. Best grades contain a high percentage of cobalt to resist impact.

Most dies are simple rectangles with oval cavities. The finished (smallest) diameter is called the blade; the approach is called the taper.

Ovality reduces splitting under high pressure. More is placed in the taper than the blade—the difference is blended. Most users report that practically all die splitting is caused by incorrect ovality.

Multiple Tapers—With one set of dies, multiple tapers are difficult. It's better to break the operation down into several steps. You can mount two or more dies in a single machine at once. They are easily reworked and hold concentricity of tapers to within plus or minus 0.002 in.

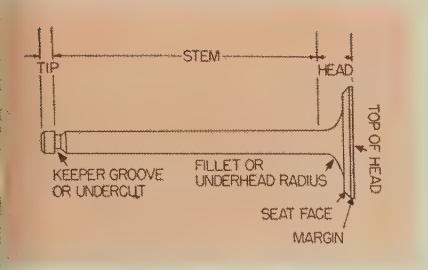
Suggestions—Most machinemakers agree that assembly is the field which holds most promise. Although widely used for attaching ferrules to tubes and fittings to cables, some of the simple joining now done with brazing, soldering, and riveting could be done adequately with swaging.

Bearings in tubes, Calrod units, and metal handles on tools are examples of what can be done.

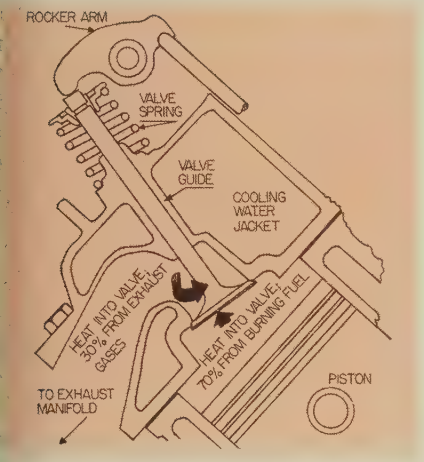
Trends—Although the basic machine hasn't changed a great deal, new models for longer tapers and larger outside diameters are starting to make their appearance. Abbey Etna says European partmakers are taking an active part in the development.

There has been some effort to fit swagers to in-line production. Its simplicity encourages such moves. You can look for more of them in the future.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*



Nomenclature of poppet valve parts



Excessive heating is a major problem in valve design. Nearly three-fourths of the heat comes from fuel combustion

Valves vary radically in design. Some use sodium to aid in cooling

Choosing Valve Materials

Poppet valve problems can often be solved by using the right material to eliminate failures. Each type requires special design to meet the problems presented by new uses

By JOSEPH R. DRIEAR
Metallurgical Laboratory Supervisor
Eaton Mfg. Co.
Detroit, Mich.

FEW people realize the complexity of valves. Several different metals often must be combined to meet difficult physical requirements. Choice of materials is vital.

Valves must be capable of making and breaking a gastight seal at pressures of 500 to 1000 psi over a temperature range of 600 to 1350° F. They must be strong enough to make up to 2000 sealing actions a minute and have a life expectancy of 60 million cycles.

As many as five or six different metals are used for one heavy duty valve. Each material is used where its special features are needed.

Example—One aircraft type is made with an Inconel "M" base. A tool steel tip is buttwelded on it and hardened for wear and burning resistance.

The stem is coated with a 0.005 in. layer of AMS-4775 (a nickel-base chrome alloy containing hard borides) for wear resistance. The top of the head and the seat are coated with a Cr-Ni-W alloy.

Heat in the aircraft engine creates temperatures so high that ordinary valves do not hold their shape and fail to provide a seal.

Sodium is used in hollows of the valves to give a cooling effect. When it melts and splashes around inside the valve, heat is transferred from the top of the valve to the stem and is dissipated through the guide.

Design and the selection of proper materials are primarily determined by the service requirements. There are two classes of service: Inlet and exhaust.

Inlet Valves—They open to admit a cool atomized fuel and air mixture into the combustion chamber and close to prevent the mixture from escaping.

The valves are cooled by the rush of the incoming air. They seldom operate at more than 600 to 800° F.

To reduce sealing surface wear, the seats are hardened. They are commonly made from a low alloy steel, such as SAE 1041, which is easily hardened.

Certain conditions require the use of highly alloyed materials, such as Silchrome XBe or Silchrome 10, for burning resistance. The tip of the valve is hardened to prevent wear by the rocker arm.

Exhaust Valves — They open toward the end of the power stroke and permit escape of the

Common Poppet Valve Materials

	TYPE ANALYSIS, %							
	C	Cr	Si	Ni	Mn	Other	HARDENABLE BY	USE
SAE 1041	0.40	.	0.22	. . .	1.50	. . . .	Quenching	Inlet valves
Silchrome #1	0.45	8.5	3.25	0.40*	0.40	. . . .	Quenching	Inlet valves
Silchrome XBe	0.81	20.0	2.25	1.30	0.40	. . . .	Quenching**	Inlet and sodium-cooled exhaust
Silchrome 10	0.37	19.0	3.0	8.0	1.05	. . . .	Precipitation Hardening (PH)	Inlet and exhaust
21-4N	0.52	21.0	0.25*	4.0	9.0	0.44 N	PH	Exhaust
21-12N	0.20	21.0	1.00	11.5	1.25	0.20 N	PH	Exhaust
Silchrome 142	0.45	14.0	0.55	14.0	0.70*	0.35 Mo 2.37 W	PH	Sodium-cooled aircraft exhaust
N-155	0.12	21.25	1.0*	20.0	1.5	19.75 Co 2.5 W 3.0 Mo		Exhaust
Inconel "M"	0.07	16.0	0.15*	Bal	2.25	3.05 Ti 0.10 Al* 8.0 Fe*	PH	Exhaust and sodium-cooled aircraft exhaust
Nimonic 90	0.10	19.5	1.5*	Bal	1.0*	5.0 Fe* 18.0 Co 2.25 Ti 1.70 Al	PH	Exhaust
Bright Ray	0.22	20.0	0.3*	Bal	0.80	1.0 Fe*	Not hardenable	Burning resistant coating
Eatonite	2.37	29.0	1.0*	39.0	. . .	10 Co 15 W 8.0 Fe*	Contains hard carbides	Wear and burning resistant seat face coating
AMS-4775	0.95	16.5	4.0	70.0	. . .	4.0 Fe 3.75 B	Contains hard borides	Wear resistant stem coating
Cr-Ni-W Alloy	2.00	26.0	0.50*	Bal	0.50*	0.30 Co* 8.70 W 4.0 Fe*	Contains hard carbides	Wear and burning resistant coating

*Maximum.
**Precipitation hardening.

burned gases from the combustion chamber into the exhaust system.

Large areas on the heads are exposed to the heat of the burning fuel. The underhead radius is heated by the 1800 to 2100° F gases exhausted.

Cooling is by conduction through the stem into the guide and through the seat into the cylinder block.

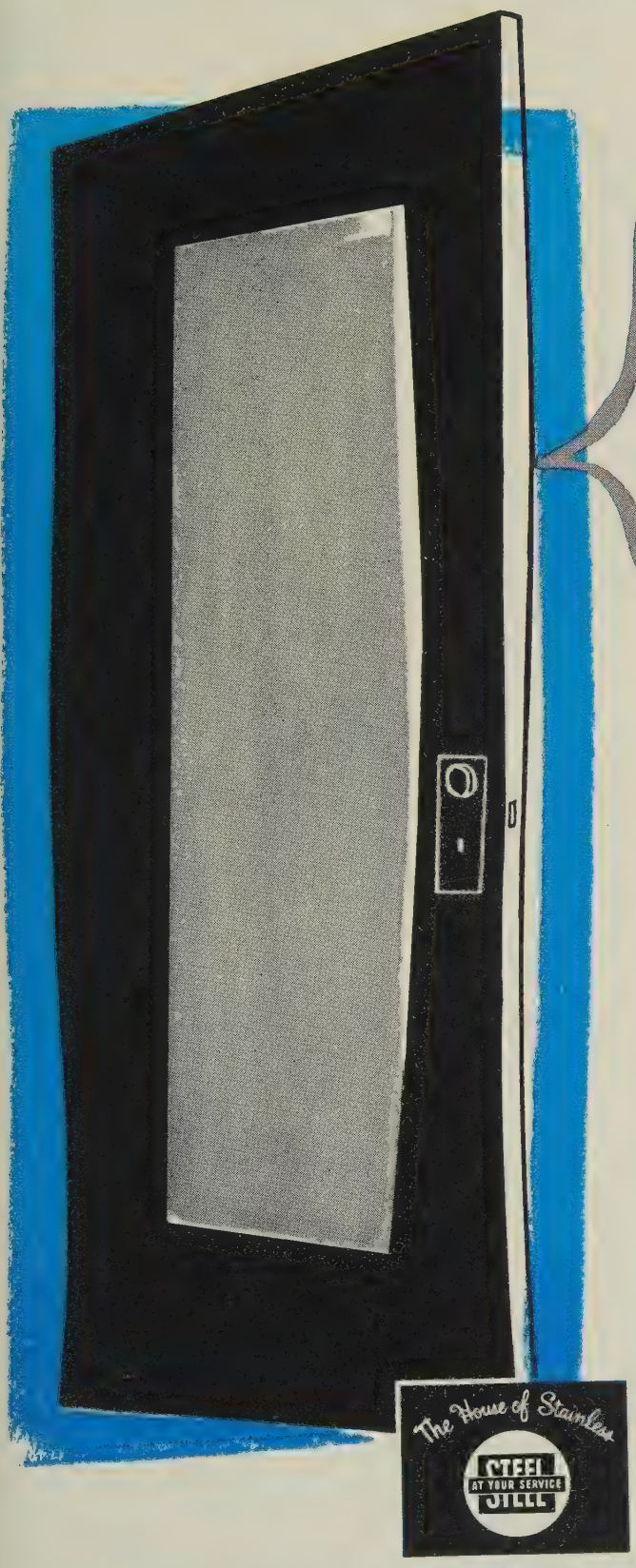
Materials are chosen for their resistance to oxidation and to corrosive attack by lead compounds (which result from burning leaded fuels) and for stress-rupture strength at high temperatures.

Most materials are austenitic; some are nickel-base alloys with iron present only as an impurity. The table shows typical materials.

Hardened tips are made by butt-welding Silchrome #1 or Silchrome XBe steel to the austenitic head and stem. In certain applications, Silchrome 10 and 21-4N steels are used without added hardenable tip material.

Valvemaking — To make the manufacturing methods are used. Forge extrusion is a common method. A heated slug of bar stock is placed in a press and pressed partially through a die to form the stem. In another die, the remaining nub of stock is spread to form the head.

Many austenitic steels and super-alloys are so stiff that they must be worked at temperatures close to their melting points. Careful temperature control is required.



"You mean THE HOUSE OF STAINLESS gives all this METALLURGICAL SERVICE free?"

What does metallurgical service from The House of Stainless mean to you?

It can mean help in selecting the type of stainless best suited to your particular needs. However, in actual practice, CSS service often goes far beyond the specific recommendation of material.

Because this metallurgical service is manned by trained personnel with practical shop experience, you can expect assistance in almost any way you need it. The following production helps are typical:

- **Exploring possible avenues for greater economies.**
- **How best to work with the material selected.**
- **How to adapt present equipment to handle it.**
- **Help in tool design.**
- **Recommendations on drawing compounds and lubricants.**
- **Counsel on set-up and operating procedures.**

In short, this service can be as broad and inclusive as your needs demand. And it's available to you at any time . . . without charge.

The House of Stainless welcomes the opportunity to extend this assistance and then back it up with prompt deliveries from warehouse stocks or direct mill shipments through our mill placement department.

Just phone LAfayette 3-7210

CHICAGO STEEL SERVICE COMPANY

Kildare Avenue at 45th Street, Chicago 32, Illinois • Mailing Address: P. O. Box 6308, Chicago 80, Ill.

Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone BRoadway 3-7874

Sales Representatives at Bloomington and Rockford, Illinois; Indianapolis and South Bend, Indiana; Cedar Rapids and Davenport, Iowa; Grand Rapids, Michigan; Minneapolis, Minnesota; Appleton, Wisconsin.

YOUR DEPENDABLE SOURCE FOR BOTH CARBON AND STAINLESS STEEL

Fig. 1—Oxygen Enrichment and Moisture Additions

. . . What they do to blast composition and driving rate

Proportions of Moisture and Oxygen	Blast, Per Cent by Volume O_2	N_2	H_2O	Lb C Burned by O_2	H_2O	Total	Driving Rate
Dry air	21	79.00	—	1330	——	1330	1.0*
10 grains per cu ft & 22.5% O_2	22.5	75.175	3.0	1320	95.0	1415	1.06
20 grains per cu ft & 24.0% O_2	22.56	71.44	6.0	1360	190.0	1550	1.16
30 grains per cu ft & 25.5% O_2	23.205	67.795	9.0	1393	285.0	1680	1.27

*Relative amounts of coke-carbon gasified at tuyeres by 100,000 cu ft of blast.
Source: J. H. Strassburger—*Some Engineering Aspects of American Blast Furnace Practice.*

Getting More Iron from Blast Furnaces

National Steel Corp.'s program was outlined at the 25th Blast Furnace Conference of the British Iron & Steel Research Association at Harrogate, England

DURING the last 15 years pig iron has become increasingly important in ingot production because of the increasing price of scrap and the deterioration of its quality. The expected 25 per cent increase in ingot production during the next 10 to 15 years will require more pig iron even if the present ratio of hot metal to scrap is maintained.

National Steel Corp. recognizes the economic advantages of obtaining as much additional iron as possible from blast furnaces to minimize the high capital cost of blast furnaces, coke ovens, coal mines, and transportation equipment. The objective is to obtain the optimum in iron production from each furnace with a minimum of coke rate, Julius H. Strassburger, assistant vice president-engineering, National Steel Corp., told delegates to the BISRA blast furnace conference.

More Iron — Within the next year, production of the four Weirton Steel Co. furnaces should increase from the present 5750 tons per day to 6200-6400 tons. The ultimate goal of production is in the range 7500 to 8000 tons of iron, with a coke rate decreasing to 1300 or 1350 lb of coke per ton of iron. Production of the Great Lakes Steel Corp.'s furnaces has been increased from 5200 to 5800 tons per day in three years. By 1958, the figure is expected to reach 6600 tons.

The increases in iron tonnage have been obtained by a series of improvements in furnace practice, including the use of oxygen, improved iron ore, sintering, moisture in the blast, higher blast heats, and improved coke quality.

Methods — In general, methods which can be used to obtain more iron from blast furnaces are:

1. Improvement in the grade of iron ore and concentrates charged in the burden.
2. Agglomeration of ore fines and concentrates for better sized burden (for improved furnace efficiency and better gas-solid contact).
3. Improved coke quality.
4. Sizing of limestone, use of lime and sinter, and optimum slag composition.
5. Use of moisture and oxygen in the blast.
6. Use of high blast heat with increased moisture in the blast.
7. Use of high top pressure.
8. Refinements in furnace construction and design.
9. Use of a superburden obtained from direct reduction processes.

Beneficiation—It is evident that the use of beneficiated ores will result in increased iron production with a saving in coke, limestone and "cost above." In addition, the increase in iron production is a means of making ingots with less scrap.

The Hanna Iron Ore Div. of National Steel Corp. has been making extensive studies on iron ore bene-

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

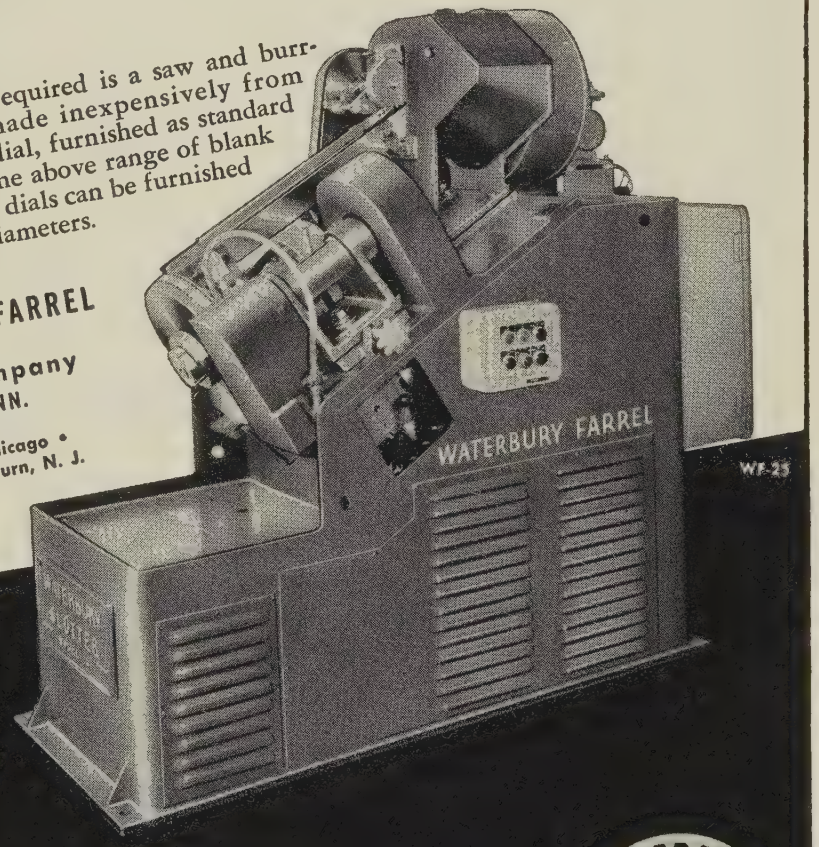
ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.



WATERBURY FARREL
Foundry and Machine Company
WATERBURY, CONN.

Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.


Bolt, Nut & Screw Machinery


Power Presses


Rolling Mill Machinery


Wire Mill Equipment


Sendzimir Mills & Other Special Machinery

WATERBURY FOUNDED 1851 FARREL

Fig. 2—Composition of Bosh Gas

Blast Conditions	(Per Cent) CO	N_2	H_2	$CO + H_2$	Relative Volumes
Dry air	34.7	65.3	—	34.7	1.00
10 grains per cu ft & 22.5% O_2	37.4	60.2	2.4	39.8	1.03
20 grains per cu ft & 24.0% O_2	39.8	55.5	4.7	44.5	1.06
30 grains per cu ft & 25.5% O_2	41.8	51.4	6.8	48.6	1.09

BLAST FURNACES . . .

ficiation and is installing various methods, including washing, heavy media, cyclones, and magnetic separation. It's also making pilot studies of magnetic roasting and separation.

National Steel is operating an 8 ft x 104 ft continuous pallet sintering plant that produces 75,000 to 80,000 tons of sinter per month at Weirton Steel. At Great Lakes, a 6 ft x 102 ft continuous pallet sintering plant is producing 45,000 tons of sinter per month. In addition, the Hanna Furnace Div. at Buffalo is receiving about 1500 tons of sinter daily. It is processed at the adjacent Buffalo Sintering Co.

New Facilities — National Steel is constructing two iron ore sintering machines which are said to be the biggest in the world. At the Great Lakes Div., a plant having a continuous strand 12 ft wide x 199 ft 6 in. active length, with a rated capacity of 8400 tons of sinter daily, is being built.

At Weirton Steel Co., a similar 12 ft x 147 ft continuous sintering machine is being constructed. Its rated capacity is 6000 tons of sinter daily. With the completion of the two plants, the Weirton and Great Lakes divisions will have complete facilities for crushing, screening, sizing, and agglomeration of the entire iron ore burden for the blast furnaces at each plant.

Burden—When finished, the burden will consist of sinter and coarse oversize ore between ⅜ in. and 2 in., in the ratio of 60 per cent sinter and 40 per cent sized ore. The sinter will be made with about 10 per cent limestone fines so that it will be partially self-fluxing.

Completely self-fluxing sinter will be developed after the plants are in operation. The use of lime in the sinter provides a saving in coke required for calcination of the limestone. It also reduces the solution loss which would be caused by the carbon dioxide gas driven off the limestone if it were calcined within the furnace.

The benefits of sized ore have been proved at the Great Lakes plant, where, starting in June, a Lake ore sized between ½ in. and 1½ in. was charged. The use of this ore (with about 30 to 35 per cent of coarse ore in the burden) showed a reduction of about 100 lb in coke rate, with a corresponding increase in iron production.

Coke Quality — Both pulverization and granulation of coal are being practiced, and the results indicate that by proper coal sizing, improved coke quality can be obtained. For example, at Weirton, starting in April, better granulation and sizing of the coal increased the stability of the coke from about 44 per cent to 50-53 per cent; the stability of plus-2-in. furnace coke was increased from 45 per cent to 50 per cent.

In addition to improvements in the preparation of coals within the coke plant, washing practices are being studied to obtain the best quality coke from existing coals and better quality from the inferior coals which might be used in the future.

Operations at Weirton have shown a definite relationship between coke quality (as determined by coal mix and coal preparation) and blast furnace performance in both iron production and coke rate.

Oxygen—Since February, 1951,

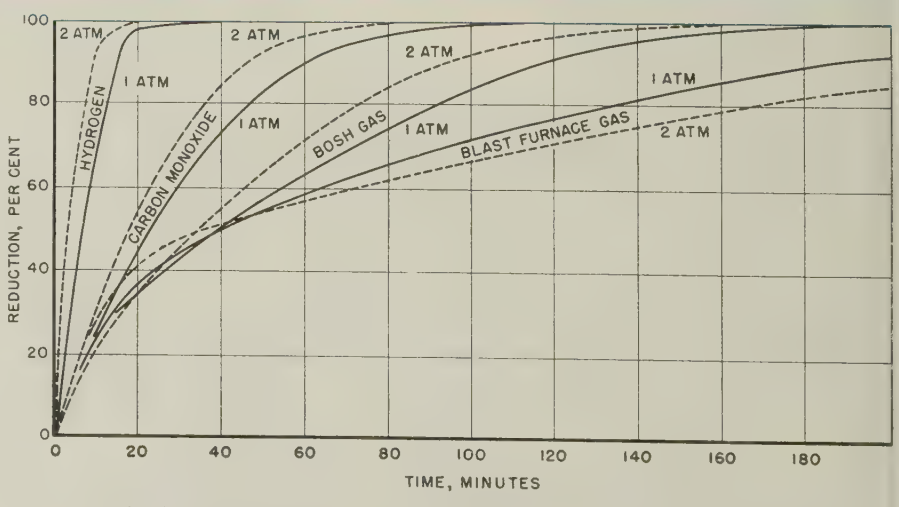


Fig. 3—Average effect of pressure on reduction time with various gases at 1830°F

BLAST FURNACES . . .

the Weirton Steel Div. has used oxygen enrichment in its blast furnace to increase iron production. Additions of up to 4 per cent oxygen have been made with highly satisfactory results. For example, 4 per cent enrichment has resulted in a 19 per cent increase in iron production.

The present 500-ton-per-day oxygen plant provides for an average enrichment of about 1.8 per cent for the four furnaces. A second, 500-ton oxygen plant which will double the supply is being considered.

During 6½ years of oxygen practice, the blast furnace operation has shown continuing improvement, with smoother working furnaces, increased iron production, and a modest reduction in coke rate. Development of correct techniques in the use of oxygen enrichment made this possible.

Refractories—Three of the four furnaces on oxygen enrichment for three to five years have been taken out of blast for relining. All three furnaces made between 3,100,000 and 3,500,000 net tons of hot metal on the lining. When blown out, the linings were in comparatively good condition with no evidence of deterioration due to use of oxygen.

Moisture — In developing the practice of oxygen enrichment, said Mr. Strassburger, "we recognized that it would be necessary to use controlled additions of moisture in the blast to have a smooth working furnace with Lake ores and to take full advantage of the additional oxygen in the blast." Automatic controls for oxygen enrichment and moisture additions were installed with the original oxygen plant.

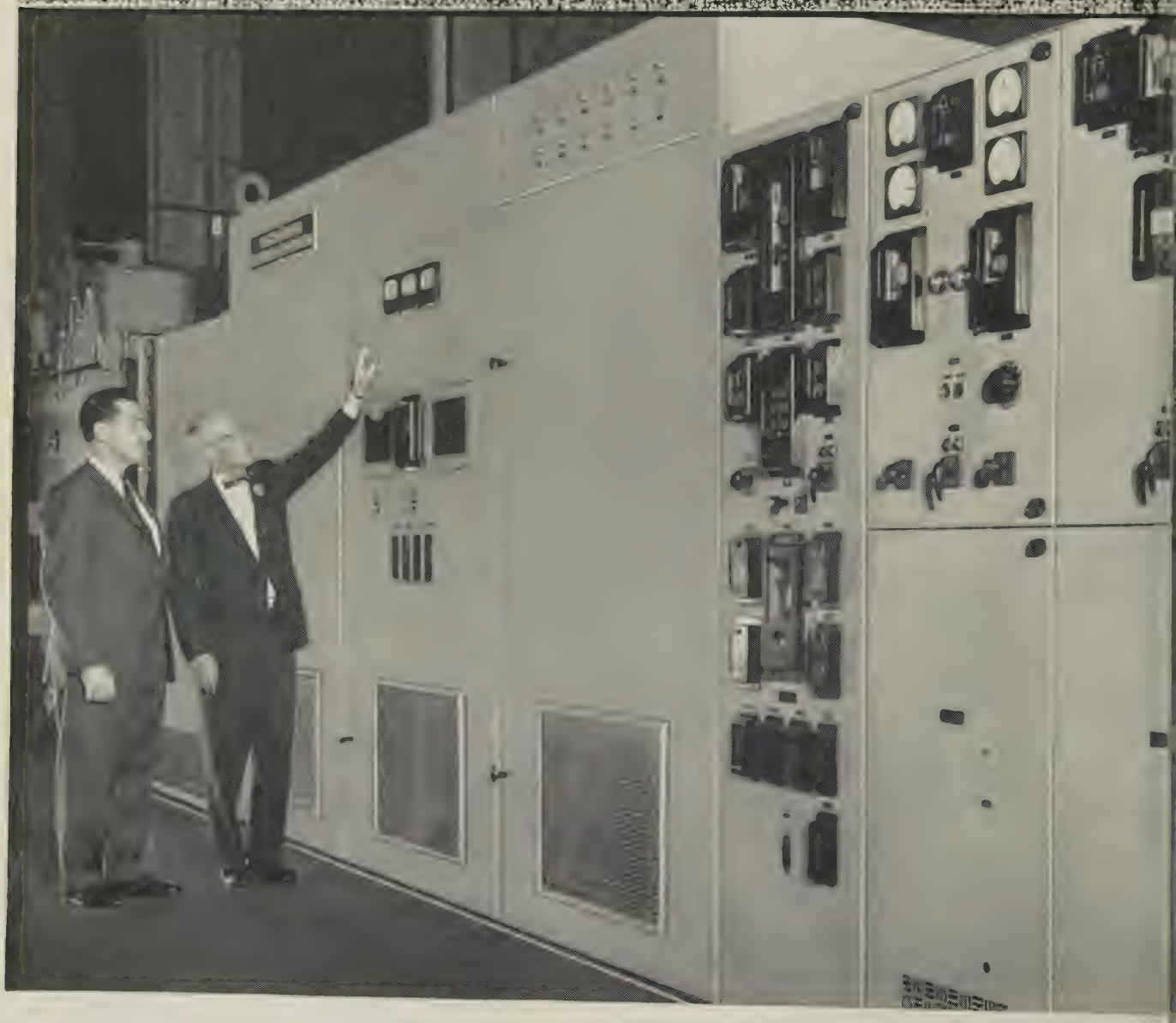
The use of moisture probably has an effect on the size and extent of the combustion zones in front of the tuyeres. It tends to lengthen these zones; oxygen or high blast heat or both tend to shorten the combustion zones, with a sharpening up of the combustion process.

The theory is that the lengthening and enlargement of the combustion zones in front of the tuyeres open up the troughlike space between the tuyeres and the deadman. This makes more an-

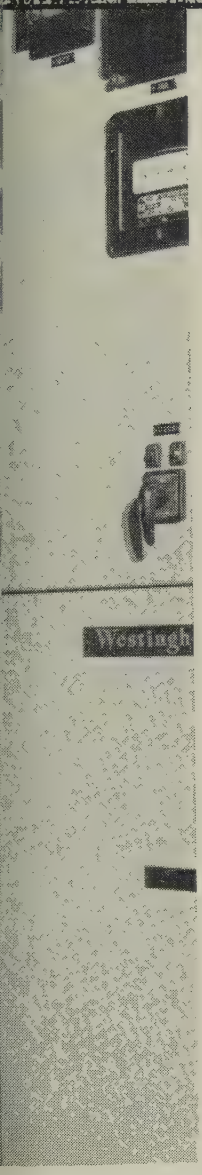
(*Please turn to page* 172)

for dependable DC power...plus

Steel mill lists 7 "musts" for a rectifier...



orders Westinghouse Ignitron



BEFORE MAKING A DECISION on the purchase of a rectifier, the chief electrical engineer of a large Eastern steel mill jotted down 7 "musts". His search for the ideal steel mill rectifier soon ended, for he found that the Westinghouse Ignitron met all of his requirements:

LOW INSTALLATION COST Simply interconnect the adjacent metal cubicles which are pre-wired.

SMALL FLOOR SPACE The Ignitron assembly and auxiliary equipment are contained in compact cubicles which are close-coupled.

NO SPECIAL FOUNDATION Any reasonably level floor of normal strength will do.

SAFE Grounded dead-front metal enclosure permits safe location in any available space. No need for fencing or insulated floors.

LOW MAINTENANCE Principle of operation permits simple design . . . no major moving parts.

HIGH OVERLOAD CAPACITY Momentary overloads and short circuits won't damage the Westinghouse Ignitron.

LOW OPERATING COST High efficiency . . . low arc-drop loss. Simple automatic operation . . . freedom from problems of high starting demand and synchronization.

Ignitron Rectifiers were invented by Westinghouse and over 5,000,000 kilowatts have been supplied to satisfied users in industry. For the type — pumped or sealed — best suited for your needs, call your Westinghouse sales representative or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-15002

YOU CAN BE SURE... IF IT'S Westinghouse

BLAST FURNACES . . .

nulus area available for the upgoing gases; there is less resistance to gas flow, and the result is a smoother, faster working furnace.

Balance—An increasing amount of moisture is necessary as more oxygen is introduced into the blast. The tabulation below illustrates this practice based on hot blast temperatures of 1100 to 1150° F.

Oxygen Enrichment	Moisture in Grains per cu ft
1.0 %	5
1.5	6
2.0	7
2.5	8
3.0	10
4.0	14

During the last several months, Weirton has used a hotter blast with moisture in the blast above that required with oxygen enrichment. About a 30° F increase in blast heat is required for each grain of moisture added. For example, if ten grains more than necessary are added to a furnace operating at 1200° F, a blast temperature of 1500° F or an increase of 300° F will be necessary to take care of the addition.

Efficiency—The CO/CO_2 ratio is in the range of 1.70 to 1.72 on No. 3 and 4 furnaces, with 3 to 4 per cent oxygen enrichment, 25 to 40 per cent sinter, and 10 to 12 per cent sized coarse ore in the burden. This indicates a furnace operation with good gas-solid contact. With beneficiated burdens, results obtained with oxygen enrichment, high blast heat, and moisture additions become significantly better.

The top gas for No. 4 furnace operating with 4 per cent enrichment and 50 per cent sinter in the burden averages:

Top Gas	Per Cent
CO_2	16.7
CO	28.4
H_2	5.6
N_2	49.3
Btu	106.8

The higher Btu in the top gas makes this furnace gas more suitable for the underfiring of coke ovens, steam generation, heating of soaking pits, and other steel

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.	Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.	Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.	Patching linings and baffles and for any application where plastering rather than gunning or casting is required.
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.	Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.
B&W Kaolite 22	2200	Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42ND ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R56

BLAST FURNACES . . .

plant operations.

Driving Rate—Fig. 1 and 2 illustrate the effect of oxygen enrichment and moisture additions on the driving rate and the composition of the blast in blast furnace practice. Note that the driving rate of a blast furnace based on pounds of carbon burned per 10,000 cu ft of blast increases up to 27 per cent with 4.5 per cent oxygen enrichment and 30 grains of moisture. Comparison is made with the driving rate of a furnace on dry, normal air without oxygen enrichment.

Faster Reduction—The use of oxygen enrichment together with humidification of the blast results in an increase in the carbon monoxide and hydrogen content of the bosh gas with a significant decrease in the nitrogen. The combined carbon monoxide and hydrogen increases from 34.7 per cent with normal dry air up to 48.6 per cent with blast air containing 4.5 per cent oxygen enrichment and 30 grains of moisture per cu ft.

Mr. Strassburger believes that more hydrogen in the bosh gas has a definite beneficial effect on the reduction of iron ore in the stack. Fig. 3 shows that at 1 atmosphere bosh gas produced from normal air requires about 118 minutes for 90 per cent reduction of the ore; carbon monoxide requires 61 minutes and hydrogen 15 minutes. Any tendency to enrich the bosh gas with more hydrogen, more carbon monoxide, or both, and less nitrogen should result in faster reduction of the iron ore and a better driving blast furnace.

High Top Pressure—Here is another means of obtaining increased iron production by making it possible to blow additional wind volume. Great Lakes is using high top pressure in the range of 6 to 7 lb on furnaces No. 1 and 4.

Experience indicates that high top pressure will make possible increased iron production with somewhat lower flue dust, but the optimum benefits of high top pressure are obtained when using a sized burden. The ability to obtain gas-solid contact by better gas distribution will make it possible to obtain the maximum benefits of high top pressure.

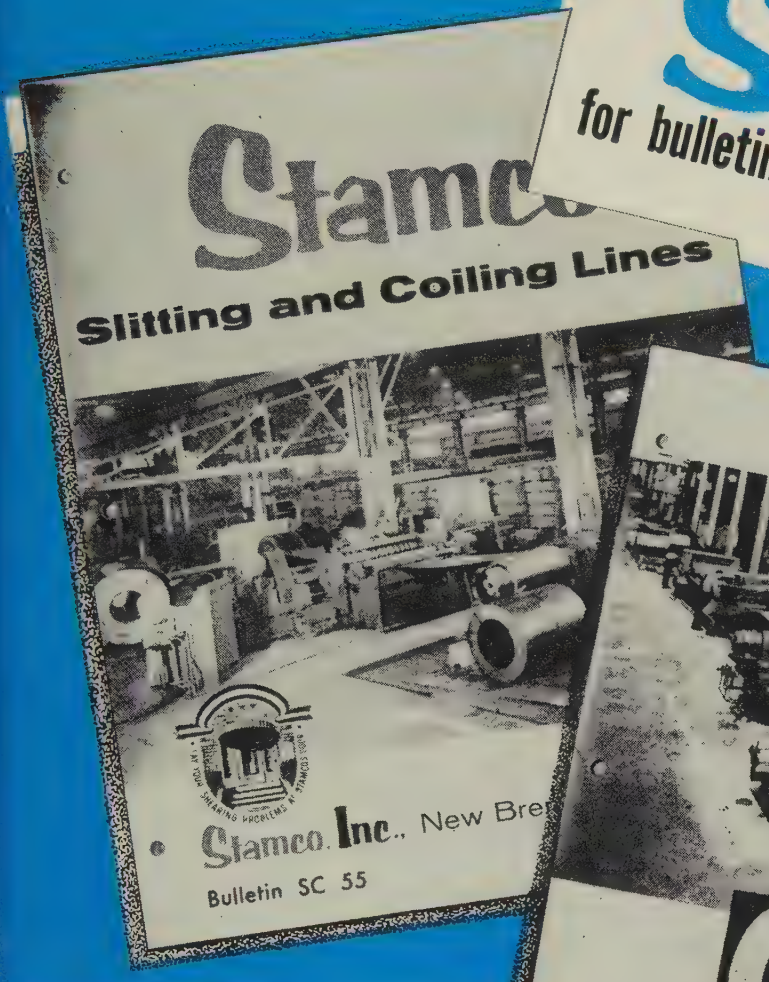
Refinements — During relining

For Coiling and Sheeting Applications

— call or write

Stamco

for bulletins on equipment you need



Stamco has equipment available in a wide range of sizes and speeds for coiling and sheeting applications in mill, warehouse or factory. These bulletins tell the complete story. Request them by number on your letterhead. No obligation.

• LAY YOUR SLITTING PROBLEMS AT STAMCO'S DOOR •

STAMCO, Inc., New Bremen, Ohio

BLAST FURNACES . . .

periods, several changes in construction and facilities are being planned for National Steel blast furnaces. The aim is to obtain increased production with higher furnace efficiency:

1. Additional blast heating capacity will be provided in the form of additional stoves or by the installation of automatic stove changing equipment. The purpose is to obtain the optimum blast heat from stoves when their capacities make possible 1800° F straight line heat. With the use of higher blast heat, facilities will be provided for maintaining up to 30 grains of moisture additions for furnaces on oxygen—and possibly 20 to 25 grains of moisture on furnaces with normal air blowing.

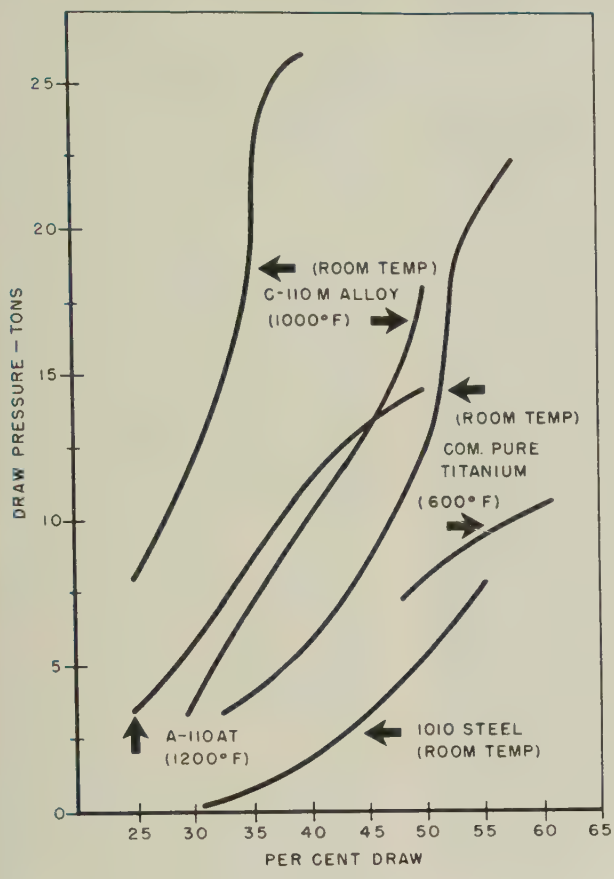
2. Orifice gas washers will be installed for primary cleaning of gas ahead of the stove precipitators to under 0.05 grains of dust per cubic foot. With this clean primary gas, stove precipitators should produce a gas with a dust content well under 0.005 grains per cubic foot. This will insure cleaner stoves and the maintenance of stove efficiency over a number of years.

3. Modified high top pressure will be provided. In addition to benefits already stated, it will provide the additional pressure required for orifice type gas washing.

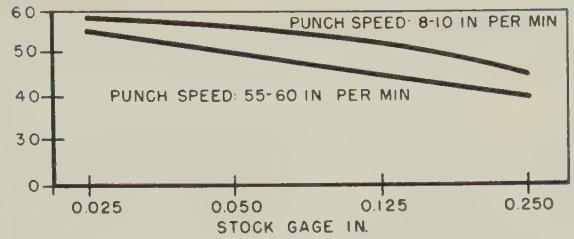
4. Carbon lined, water cooled boshes will be installed to obtain cleaner bosh operation and possibly larger furnace volume.

Superburden — Direct reduction processes are being closely followed by investigation and pilot plant work at National Steel. These processes are stated to be primarily for the production of either synthetic scrap or sponge iron. It is possible that a modified process will make possible the production of a superburden which would contain up to 85 per cent Fe in about a 70 per cent metalized condition.

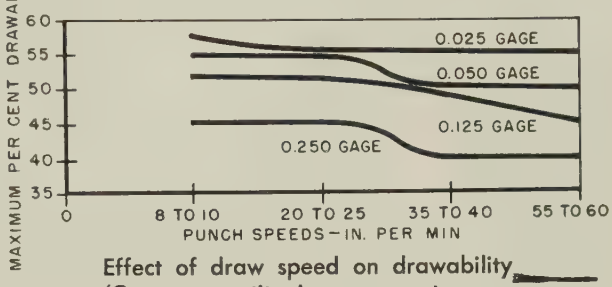
Charging this type material in a blast furnace would make a substantial reduction in coke requirements and an increase in furnace iron production. It would convert a briquetted high grade burden charge into hot metal more suitable for fast charging into open hearths and melting furnaces to obtain maximum ingot production.



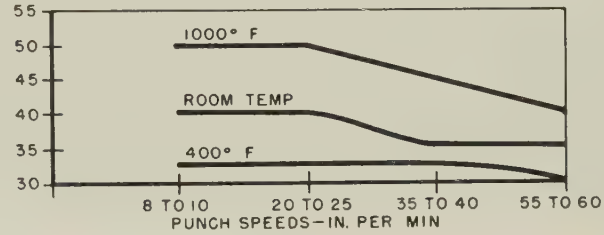
Pressure curves for 0.050-in. material (for 3-in. ID cups)



Effect of thickness on drawability (Com. pure titanium; room temperature)



Effect of draw speed on drawability (Com. pure titanium; room temperature)



Effect of draw speed on drawability (Alloy C-110M, 0.050-in. material)

Drawability of Titanium Defined

Thinner gages can be drawn cold; heavier ones work better when heated. Large corner radiuses help stubborn cases. Here are some research findings

THE GRAPHS illustrate some important drawing characteristics of commercially pure titanium and alloys C-110M and A-110AT.

They are the results of an extensive testing program at Worcester Pressed Steel Co., Worcester, Mass. The firm tried four stock gages, four punch speeds, six operating temperatures, and 15 blank diameters. A hydraulic press was used to insure uniform draw speed.

Conclusions — Investigators found that these are the best general operating conditions:

- Commercially pure titanium up to 0.050 in. thick draws well at room temperature; material 0.125 and 0.250 in. thick should be heated to 800° F.
- The alloy C-110M shows best results at 1000° F. At that heat, the metal can be drawn 50 per cent at speeds between 8 and 25 in. per minute. Increasing the speed lowers the draw percentage.
- A-110AT is limited to slow punch speeds except at room temperature. You can get 30 per cent draws with punch speeds between 8 and 40 in. per minute. The alloy can be drawn 35 per cent by heating it to 1200° F.
- Heavier gages (those over 0.050 in.) should be heated to get draws equal to those made in lighter metal at room temperature.

Formula—Percentage of draw is figured this way: Punch diameter is subtracted from blank diameter. The result is divided by the blank diameter and the quotient multiplied by 100.

$$\frac{(Db - d \times 100)}{Db}$$

All tests were limited to a single draw. Lubricants were standard molybdenum disulfide or graphite base types.

Critical Corners—Punch radius is critical. In one example, 0.050-in. A-110AT was drawn 35 per cent with a punch radius of 0.300 in. (6 times metal thickness). When that was increased to 0.500 in. (10 times metal thickness), 50 per cent draws were successful. Temperature was held at 1200° F.

Welding Rod Trends

Those coated with iron powder gain favor because they up speed and quality

By R. K. LEE
Alloy Rods Co.
York, Pa.

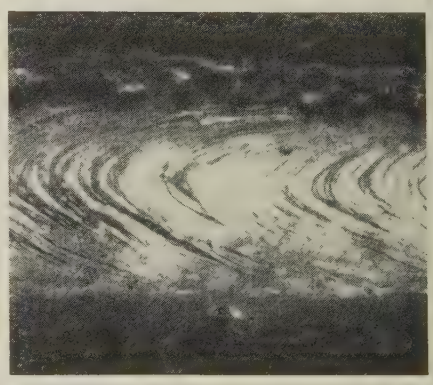
AT one time, small amounts of iron powder were used in welding rod coatings to aid fluxing action and arc stability. When it was found that more powder meant more benefits (higher welding currents, increased welding rates, and easier application), it became the basis of a new electrode.

In 1956, the nation made 181 million lb of carbon steel electrodes (E 6012). Over half were the iron powder variety (E 6024).

Why They're Better—The iron powder coating is not sufficiently conductive to cause arcing or shorting through the coating, yet it helps the core wire carry higher welding current without overheating. That's partly due to the high specific heat of iron powder. (It absorbs a considerable amount of heat.)

With conventional electrodes (no iron powder), normal arc current provides considerably more heat than is required to melt the core wire and covering. The extra energy is dissipated in melting more base metal (deep penetration), throwing out spatter, and in superheating the weld metal.

With iron powder electrodes, the extra energy from the higher welding currents is expended in melting the iron in the coating. No ex-



Arcs that are too short for conventional low hydrogen electrodes (no iron powder) produce a rough, lumpy bead like this one. Arc shorts out and freezes electrode

WELDING ROD TRENDS . . .

tra base metal is melted; spatter is almost eliminated; and the weld metal is not superheated.

Lower Labor Cost—Higher welding currents substantially increase the deposition rate. They are a big factor in reducing welding time, but another equally important benefit is a gain in weight of weld metal deposit. (To deposit a given weight, fewer electrodes are needed.)

For example, it takes about 430 (¼-in.) iron powder electrodes (E 6018) to deposit 100 lb of weld metal—only 2 in. of the electrode is not used. To deposit the same weight with a comparable E 6020 type, you need about 540 electrodes.

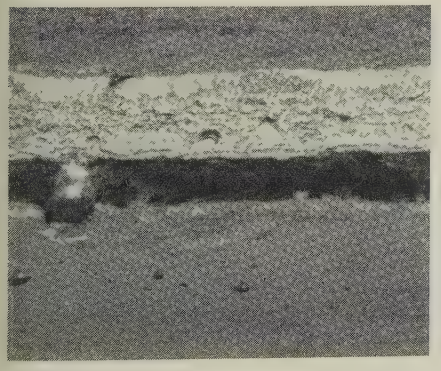
George Barrett, welding engineer, Dominion Bridge Co., Montreal, Que., uses the time interval of 2.3 minutes per electrode change. On that basis, the extra 110 electrodes require another 4 hours.

Easy To Use—The greatest appeal of the iron powder electrode is its ease of welding. Arc lengths are usually self-adjusted by touching the tip of the electrode to the work. Spatter is practically eliminated; the slag removes easily and completely; and weld beads are smooth and uniform. All welds have a good appearance.

It is generally accepted that the E 6024 has weld metal quality comparable to that of the E 6012 electrode.

Change Specification—The 6013 mild steel electrode has been converted into an iron powder version. A proposed revision of the Amer-

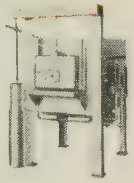
(*Please turn to Page* 186)



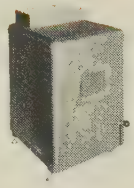
When the arc is too long for a conventional electrode it makes the weld bead porous like this one. Both short and long arcs increase operator fatigue, cut efficiency

SURFA

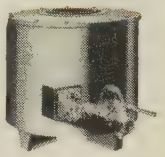
large oven



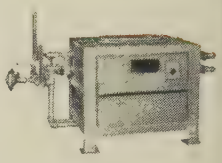
small oven



laboratory

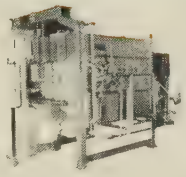


circular pot

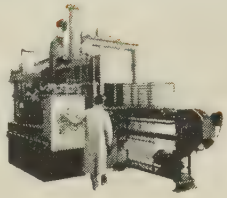


rectangular pot

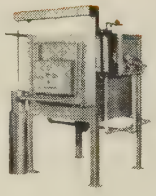
forge



balco® atmosphere



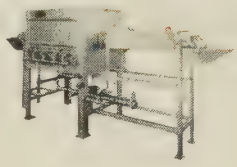
allcase® atmosphere



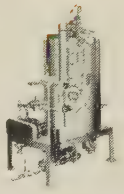
horizontal muffle

vertical muffle

brazing



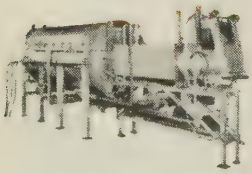
sintering



MRX® atmosphere generator

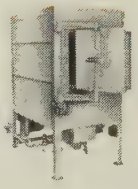
MDX® atmosphere generator

MAX® atmosphere generator

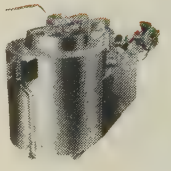


stainless steel

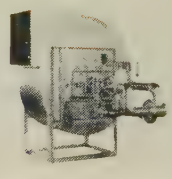
rivet heater



horizontal convection

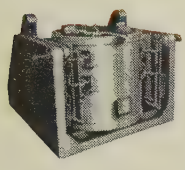


vertical convection

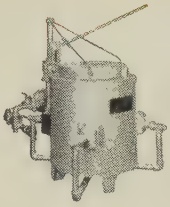


direct air heaters

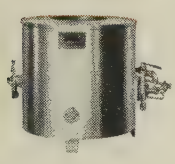
C E



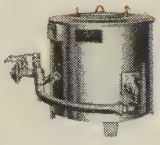
tilting metal melting



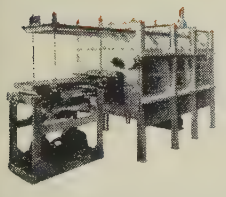
stationary
metal melting



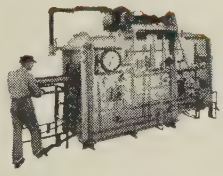
soft metal melting



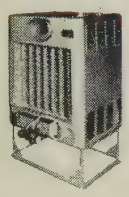
aluminum
melting-holding



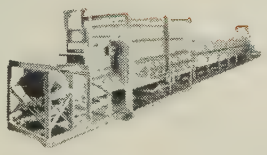
continuous
snap hearth



continuous
link belt



indirect air heaters



continuous
brazing

widest selection

The Surface line of Standard Rated equipment offers a broad range of types and sizes to choose from. Exactly what is needed can be selected. Standard furnaces can be modified to meet the demands of unusual applications.

known production rates

Rated production makes it easy to determine the quantity of finished product which a Surface unit will produce in any given period of time.

known operating costs

Tabulated figures and performance curves on all units clearly indicate in advance the operating cost per pound of finished product.

quick delivery

Surface standardization permits stocking the same parts for many different furnaces. This cuts engineering and procurement time. Surface also offers 80 types and 800 sizes of industrial burners—the same as used on Standard Rated furnaces—for application to your existing furnaces or other requirements.

Write for Bulletin SC-175.

HEAT TREAT, STEEL MILL, GLASS DIVISIONS
SURFACE COMBUSTION CORPORATION
2385 DORR STREET TOLEDO 1, OHIO

Surface

wherever heat is used in industry

WELDING ROD TRENDS . . .

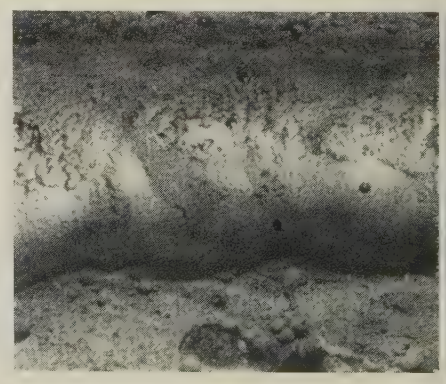
ican Welding Society specification classifies it as an E 6014. The electrode is said to be the equivalent of the E 6013 in most respects and said to be faster. Sheet metal and vertical down welding at higher current and deposition rates are its strong features. It can be used in all welding positions.

Two Methods—Either drag or open arc techniques can be used for E 6014 electrodes. The drag technique is used in fillets, while the open arc method is frequently preferred for groove welds. Typical weld beads are smooth with fine ripples. Fillet welds are flat to slightly convex.

The most recent addition to the iron powder family is a modification of the E 6010. It has outstanding characteristics for all position welding. Weld deposits have excellent x-ray and physical properties.

Two Types—Two ranges of iron powder additions have been developed for low hydrogen electrodes One, E 6018, has moderate additions of iron powder in the coating and is in an all-position type. The other, E 6028, with more iron powder and a heavier coating, is for down-hand or flat positions.

Temperamental — Conventional low hydrogen electrodes (without iron powder) have solved many welding problems, including weldments of medium hardenable steels, free machining steels, and those weldments which are later porcelain enameled. But a definite, short arc length must be held. If it is too short, the arc shorts out, and the electrode



Regular low hydrogen electrodes require low current; otherwise, quality drops and spatter increases. The example was made with 3/16-in. rod at 260 amperes.

WELDING ROD TRENDS . . .

freezes. You get a rough, lumpy weld bead, particularly noticeable in horizontal fillets (illustration, Page 180). If it's too long, you get a porous weld (illustration, Page 183).

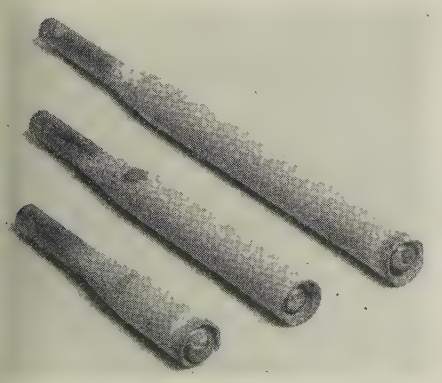
Such requirements increase operator fatigue and decrease efficiency, both in quantity and quality. Porosity, at the start of a bead as well as throughout the weld, is a definite problem with conventional low hydrogen electrodes.

Ordinary low hydrogen types require narrow and fairly low currents. If high current is used, spatter increases excessively and quality deteriorates (illustration, Page 186). Results: Low deposition rates and welding speeds.

More arc energy than is required to melt core wire and coating is a disadvantage of the conventional low hydrogen electrode, particularly in out-of-position welding. The extra base metal is difficult to control and superheating of the liquid metal slows down its freezing rate. Both characteristics increase the tendency for weld metal to run out of the weld groove (or even down the operator's neck!).

All those factors increase the cost of weldments.

Function of Powders—The addition of appreciable amounts of iron powder to a low hydrogen electrode coating eliminates or reduces the shortcomings of the conventional type. Higher welding currents used with the E 6018 version do not increase the spatter or overheat the electrodes (illustration, below). Tthat plus better flux-



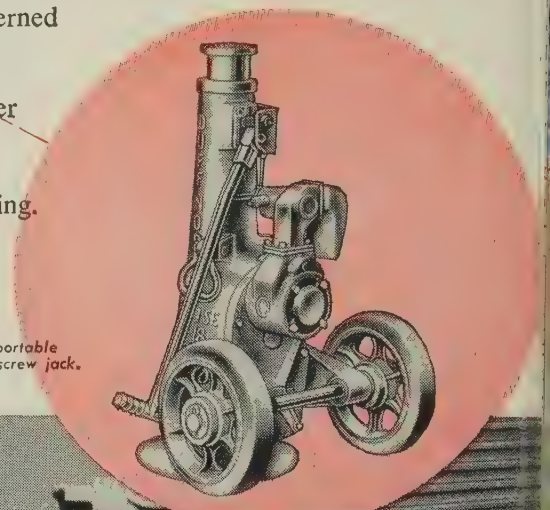
Higher welding currents and faster deposition rates are the result of adding iron powder to low hydrogen electrodes. These are stubs of 3/16-in. rods after flat welding at 300 amperes

STRENGTH PROBLEM SOLVED with Ostuco Steel Tubing

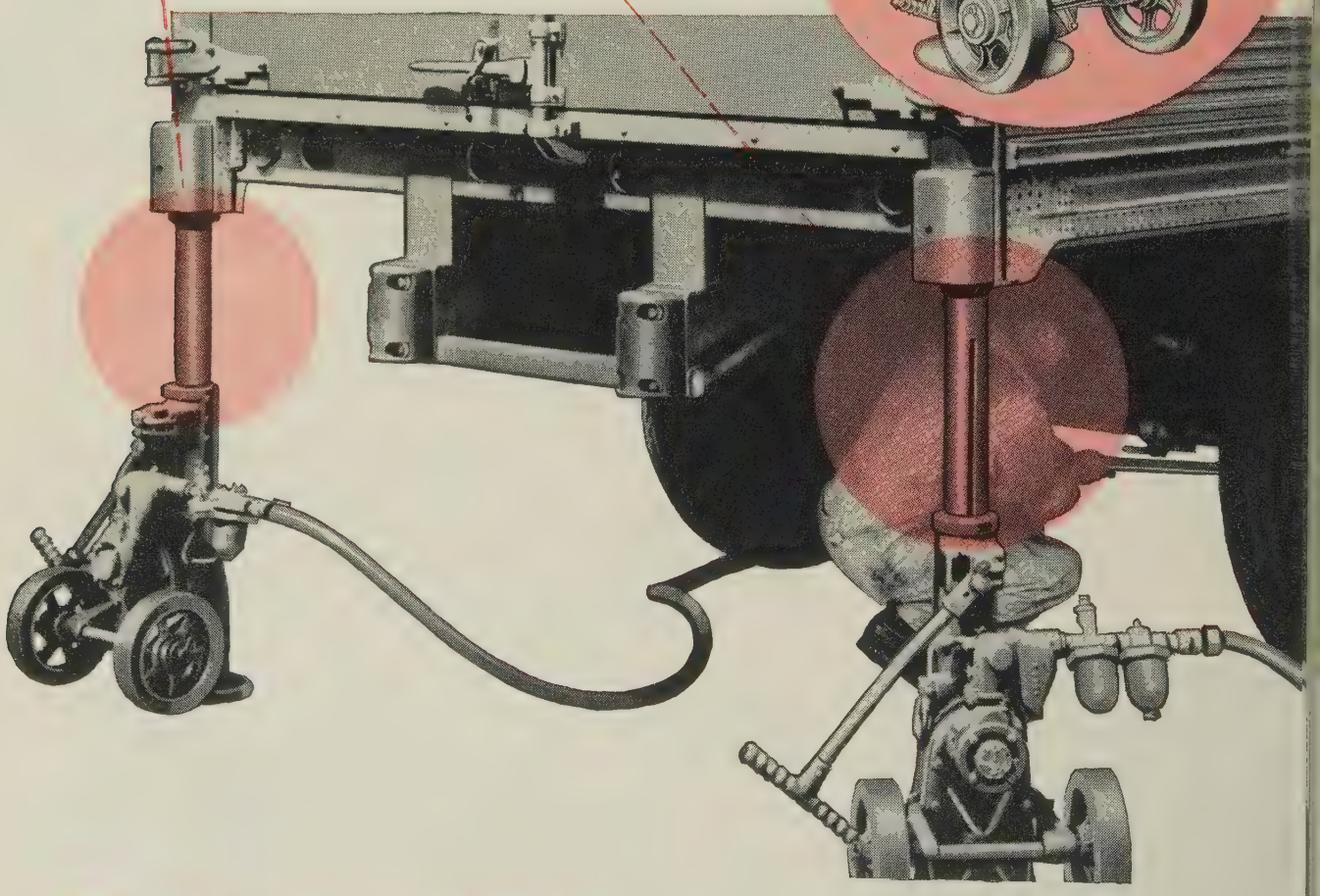
Duff-Norton Company, Pittsburgh, manufactures a portable 20-ton air motor screw jack now finding wide acceptance as a maintenance tool by the trucking industry because of its versatility, dependability, and rugged strength.

Designing this jack, Duff-Norton engineers were concerned with selection of proper material for the "Standard"—crucial part which extends to support full load weight. Seeking a material that would not fail, even under eccentric loads, Duff-Norton specified Ostuco Seamless Steel Tubing for this critical application.

Strength is just one of the plus factors of Ostuco Steel Tubing. For details on all the advantages, contact your nearest Ohio Seamless Sales office or write direct to Shelby, Ohio.



Duff-Norton's portable 20-ton air motor screw jack.



OSTUCO TUBING

MANUFACTURED IN **SHELBY, OHIO**

EXCLUSIVELY BY

OHIO SEAMLESS TUBE DIVISION

OF COPPERWELD STEEL COMPANY

SHELBY, OHIO • Birthplace of the Seamless Steel Tube Industry in America

SEAMLESS AND ELECTRIC-RESISTANCE WELDED STEEL TUBING • FABRICATING • FORGING

SALES OFFICES: Birmingham • Charlotte • Chicago (Oak Park) Cleveland • Dayton • Denver • Detroit (Ferndale) • Houston Los Angeles (Lynwood) • Moline • New York • North Kansas City • Philadelphia (Wynnewood) • Pittsburgh • Richmond Rochester • Salt Lake City • Seattle • St. Louis • St. Paul St. Petersburg • Tulsa • Wichita

CANADA: Railway & Power Engr. Corp., Ltd.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 225 Broadway, New York 7, New York

ing action practically eliminates starting porosity (illustration, below.)

The touch or drag technique eliminates the necessity of holding a definite arc length. The short arc length is controlled by the electrode itself and assures sound weld metal.

More Saving—Faster deposition rates and less lost time are not the only benefits. Better quality reduces or eliminates rework. You don't have to chip out and reweld porosity, entrapped slag, or cracks.

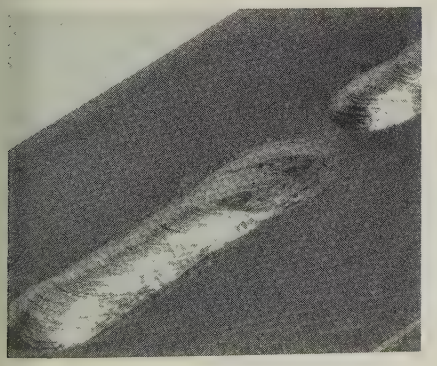
When using E 6010s, one large fabricator had to rework 10 per cent of field welds for x-ray quality. With E 6018, rework dropped to 2 per cent.

Another fabricator included 3 per cent for rework in its estimate for a large refinery reactor. When completed, no repairs were needed.

Special Type—The iron powder, low hydrogen electrodes with extra heavy coatings (which will be classified E 6028), can be used with higher welding currents for higher deposition rates. They are for use in horizontal fillets and in flat positions.

Users should consider the overall diameter when applying them to single pass fillet welding. The diameter of the larger sizes may keep it too far from a fillet root. The result is an arc which is long. You get porous weld metal with incomplete root penetration. Properly deposited, the quality of weld metal from the E 6028 is comparable to that of the E 6018.

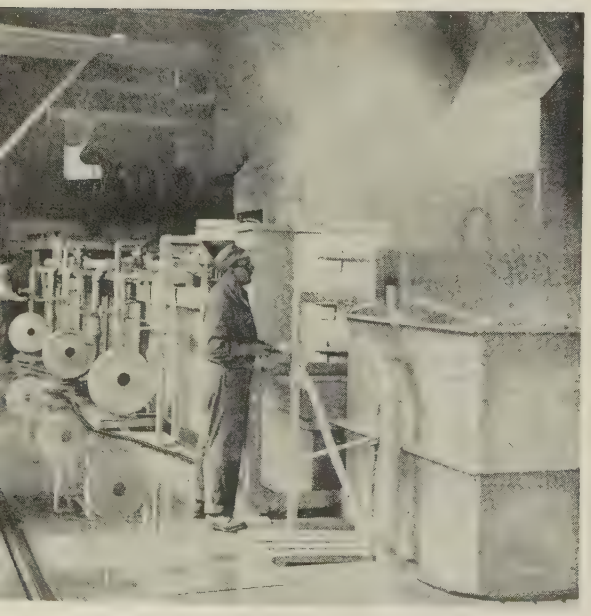
Future—The stainless electrode is the only important type not yet in the iron powder family. But it'll probably make its debut soon.



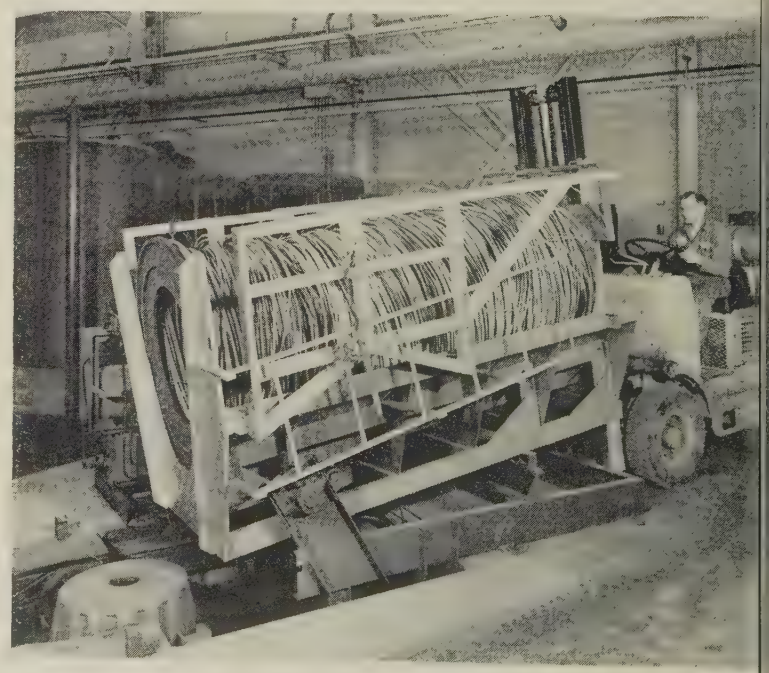
Note that starting porosity is practically eliminated by the combination of improved fluxing action of iron powder in the coating and higher welding current

Capscrew stock is prepared in an integrated process line that cleans, spheroidizes, and draws the material to obtain the proper grain structure and surface finish. Here it is delivered to the production line

Cutting Stock Preparation Costs



1 Steel rods and wire are processed through this 50-ft cleaning line by the crane in the background. Carbon and alloy steels are pickled and lime coated at the rate of 5 to 8 tons an hour



2 Coils are loaded on the rack by a lift truck, then raised to a vertical position. The stem (shown retracted here) is raised hydraulically to hold the coils in the furnace during heat treatment

PREPARING mill-finished wire for boltmaking at Cleveland Cap Screw Co. is done by a custom-built process line that cleans, anneals, and draws the material.

The use of integrated facilities has simplified raw material purchases, reduced inventory and scheduling problems, lowered production time and costs, and advanced delivery time.

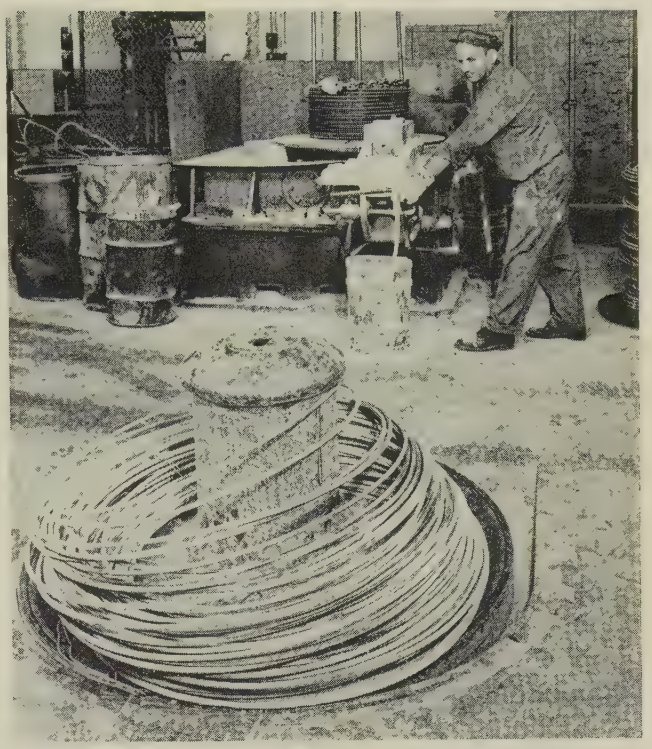
Method—Stock is prepared on an acid cleaning and lime coating line. Both are serviced by an electric tramrail crane which is an integral part of the line.

The lime is a carrier for the lubricant used in drawing. It produces a hard coating which prevents galling or seizing in extrusion during bolt forming.

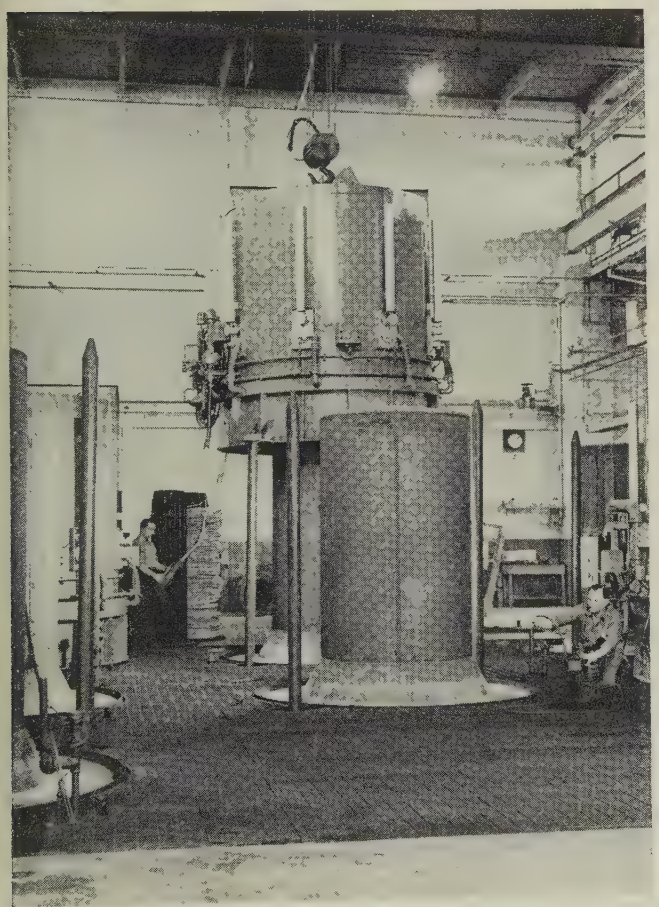
Three portable gas fired furnaces serve seven annealing bases in the spheroidizing department. The extra bases eliminate furnace downtime.

Drawing is done on variable speed drawing blocks which finish draw the material and permit close control of wire size. Tungsten carbide dies are used.

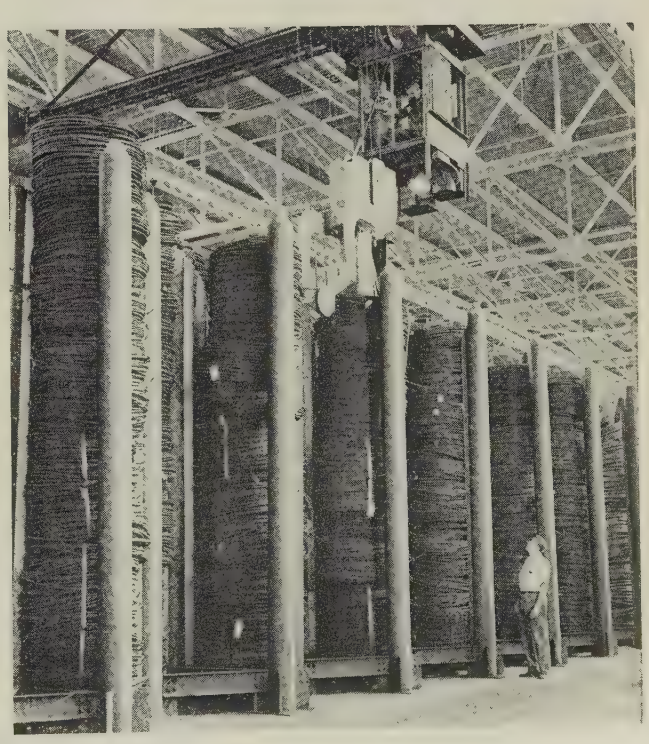
Boltmakers use the Kaufman double-extrusion process to form the hexagon head cap screws, socket screws and threaded fasteners for the end product.



4 Wire drawing is the final step of preparation. A die box behind the drawing guide supplies a dry lubricant which prevents scratching during drawing and leaves a coating on the wire for extruding



3 A retort holds a protective atmosphere around the coils. A portable furnace provides temperatures of 1200 to 1400° F to produce a spheroidized grain that improves cold forming properties



5 Large quantities of wire stock are stored for future use in cap screw production. The vertical crib provides a compact and neat storage area

Correct Lubrication in Action . . .

$13,388 saved in 6 months

Vulcanized Rubber and Plastics Company has been engaged for 75 years as a leader in precision molding and extrusion of hard and soft rubber—injection molded thermoplastic, and reinforced plastic parts for major industries and, in addition, is one of the world's largest manufacturers of combs.

Mobil

SOCONY MOBIL

Leader in Lubrication for over 92 years

in the **Rubber and Plastics Molding Industry**

on maintenance, material, man-hours!

How the Vulcanized Rubber and Plastics Company made this substantial saving with the help of Socony Mobil!

In just six months the Vulcanized Rubber and Plastics Company has saved twice the total value of all its oils and greases purchased during the whole year of 1956! Beginning January, 1957, the company protected their Morrisville, Pennsylvania, plant with a Socony Mobil program of Correct Lubrication.

Plant engineer and Mobil lubrication specialists concentrated all their efforts towards improving efficiency of the plant's 42 hydraulic systems. Hydraulic fluids were standardized . . . filtering schedules set up . . . regular maintenance periods established. Periodic Mobil laboratory reports helped check oil quality and efficiency of filtration system.

Savings were swift and sizable. Downtime dropped sharply. Hundreds of repair and maintenance man-hours were eliminated . . . material costs cut. In total, $13,388 saved on the plant's hydraulic systems.

This is Correct Lubrication in Action. The cost-cutting program that devotes Mobil specialists, Mobil facilities, and Mobil's 92 years of lubrication experience to assure utmost protection and full service life from every Mobil product.

SUMMARY OF SAVINGS ACHIEVED THROUGH CORRECT LUBRICATION

* **$1,628 saved on hydraulic oils**—Following Mobil recommendations, plant replaced eight different hydraulic oils with only two Mobil products. This improved dispensing control . . . simplified reclamation . . . cut application time.

* **$2,400 saved on hydraulic system maintenance**—Before Mobil program, maintenance on hydraulic pumps, screens and valves in the injection molding department required two men on full-time basis. Program has proved so effective that equipment today requires only periodic inspection.

* **$100 per month saved on repair parts**—Prior to Mobil program, shafts on Vane-type pumps were snapping due to contaminants wedging into close-tolerance clearances. Cleaner oil and regular application under Mobil program eliminated problem . . . cut repair parts cost $600 in 6 months.

* **$8,760 recovered on press room operation**—Compared to same period in 1956, savings made in Vulcanized Rubber and Plastics Company's Press Room amounted to: $3,960 saved through elimination of downtime. $4,800 cut by reducing maintenance man-hours. Total—$8,760 saved in six months.

Correct Lubrication

A proved program to reduce manufacturing costs

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

Electrolytic Machining Handles Tough Alloys

Heat damage and tool breakage are eliminated. Metal removal rate is rapid

NEW PROBLEMS in machining have been brought about by the development of new high alloy materials (including high-temperature nickel and cobalt-base alloys and high-strength steels of 200,000 psi and above).

They stem from heat, or cold working, and tearing of the metal. Costly cutter maintenance and grinding wheel breakdown are common with conventional tools.

A Solution—One remedial approach is electrolytic grinding and milling. It can be a valuable tool because it avoids problems caused by conventional tools.

Lynn A. Williams, president of Anocut Engineering Co., Chicago, describes electrolytic machining as a highly accelerated etching and lapping operation, similar to that used in preparing metallographic specimens.

How It Works—In the Anocut process, etching and lapping are done at the same time. It uses a rotating electrode (metal wheel) which has abrasive grains embedded in its surface. The grains protrude slightly beyond the metal and do the lapping.

An electrolytic fluid is flowed onto the working surface of the wheel, so there is an electrically conductive film between the work and the metal wheel. A low voltage, high current supply is connected to the wheel, usually through the spindle, so the work becomes electrically positive. The part being cut becomes the anode in an electrolytic circuit.

Cutting—The speed with which metal is removed is almost independent of the hardness or toughness of the material. It depends primarily on the electrochemical characteristics of the work and the area available for machining.

Differences between one kind of material and another are measurable, but they are not large when compared with the differences in conventional machining. It is the difference in machinability by con-

ELECTROLYTIC MACHINING . . .

ventional means that gives the primary indication of whether the electrolytic method should be used.

Example: It is possible to mill cast iron, aluminum forgings, or cold-rolled steel at reasonably rapid rates. But with materials of higher strength or great hardness —cemented carbides for example —a point is reached where machining is impossible.

The electrolytic process removes material from cast iron or cemented carbides at about the same rate. (The slight differences in cutting rate are sufficient to be taken into account on specific jobs.)

Most Useful Areas—The process is most useful in grinding or milling hard materials, high strength materials, and those metals which burr easily.

The hard materials include tungsten carbide, other cemented carbides, Nitralloy, and high speed steels.

High Strength Materials—Some of the newer high-strength materials having tensile strengths of 200,000 to 400,000 psi are extremely difficult to machine conventionally. Tremendous energy is required to tear the metal apart. Cutting rates are slow, and the servicing or regrinding of tools becomes a large factor in the cost.

Case History: On one job, a milling cutter could be used for only 20 minutes before it had to be resharpened.

Resharpening took a little more than 60 minutes.

The metal removal rate with electrolytic machining was not quite as good; it took 25 minutes. But no tool change was necessary. The electrode showed on measurable amount of wear and was still usable for hundreds of hours.

Thermal Damage — Frequently, the high-strength metals are sensitive to thermal damage. If a milling cutter is driven too fast, or if a grinding wheel is pushed too rapidly into the metal, there will be some amount of damage at the surface. The depth and severity of the damage will depend on the material and the speed of working.

Electrolytic machining cannot cause this kind of damage; surfaces are nearly stress-free, and studies indicate no alteration takes

ELECTROLYTIC MACHINING . . .

place in the metallurgical structure.

Burrs—Many materials that have reasonably high tensile strength but still are not in the superalloy class, are troublesome to machine because of burrs thrown up at the edges and ends of the cuts. Generally, it is necessary to remove them. On precision parts, it must be done with care.

The stainless steels fall into this group, as do the superalloys and many of the high temperature alloys. Electrolytic machining does not produce burring, and on many high temperature materials, the metal removal rate is as fast or faster than that of conventional grinding—particularly on thin sections where machining at high speed causes distortion.

Honeycombs—An example is the stainless steel honeycomb. Sections ground consist of foil one or two mils thick. The material can be electrolytically machined without burring, which is particularly helpful in the brazing operations following machining.

Metal Removal Rate—Many factors affect the removal rate in electrolytic machining, as they do in conventional methods. A general rule: Allow 1 second per inch of length for each 0.001 in. depth.

If a cut 1 in. long is to be made at a depth of 0.010 in., it will take about 10 seconds: If the cut is to be 0.060 in. deep, it will take about 60 seconds. If the cut is 2 in. long, it will take 120 seconds.

The speed of the cut generally is independent of the width of cut (a cut 2 in. wide can be made just as fast as a cut 1 in. wide if there is sufficient electrical capacity to permit electrolytic attack over the entire wheel width at the maximum rate).

Special Forms—Because no substantial heat is produced at the working surface, it is possible to take wide cuts that would be prohibitive with conventional grinding. Where the nature of the work permits, it may be possible to do the work faster and better by using the flat side of a wheel instead of the periphery.

When special shapes or forms are required, the shape may be formed into the grinding wheel and reproduced in the work.

pH Controls Rinse for Bright Dip Unit

Solves problem of limited make-up water and neutralization of plant effluent

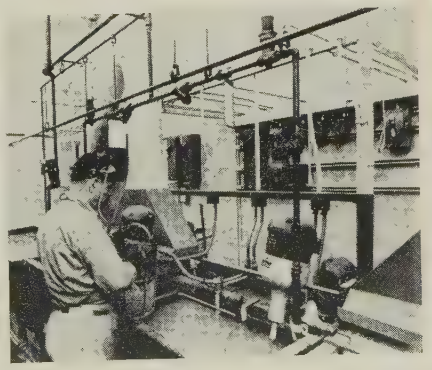
AT Leeds & Northrup Co.'s new North Wales, Pa., plant, pH control in the acid bright dip installation conserves water and neutralizes acid wastes before they are discharged into the municipal sewage system.

Many soldering operations are necessary at the plant, where all the company's recording instruments are made. Before parts are joined, they must be free of grease, dirt, or oxides. Cleaning is done by the bright dip process.

How It's Done—Parts are loaded into a stainless steel basket, dipped into a hot sulfuric acid bath, then into a cold 50-50 mixture of sulfuric and nitric acid. Acid is removed by dipping the basket into three water rinses—two cold, one hot.

Installation Problems—Two conditions had to be met before the bright dip process was installed. One was the need to minimize the amount of makeup water used to keep the rinse water sufficiently neutral. The most common way to do it is to flow water continuously through the tank. But the method was not practical at North Wales. The water supply from the plant's wells is limited; borough water is

(*Please turn to Page* 206)



Conductivity cell in center of rinse tanks senses acidic condition. Solenoid valve (top) admits enough make-up water to reduce acidity

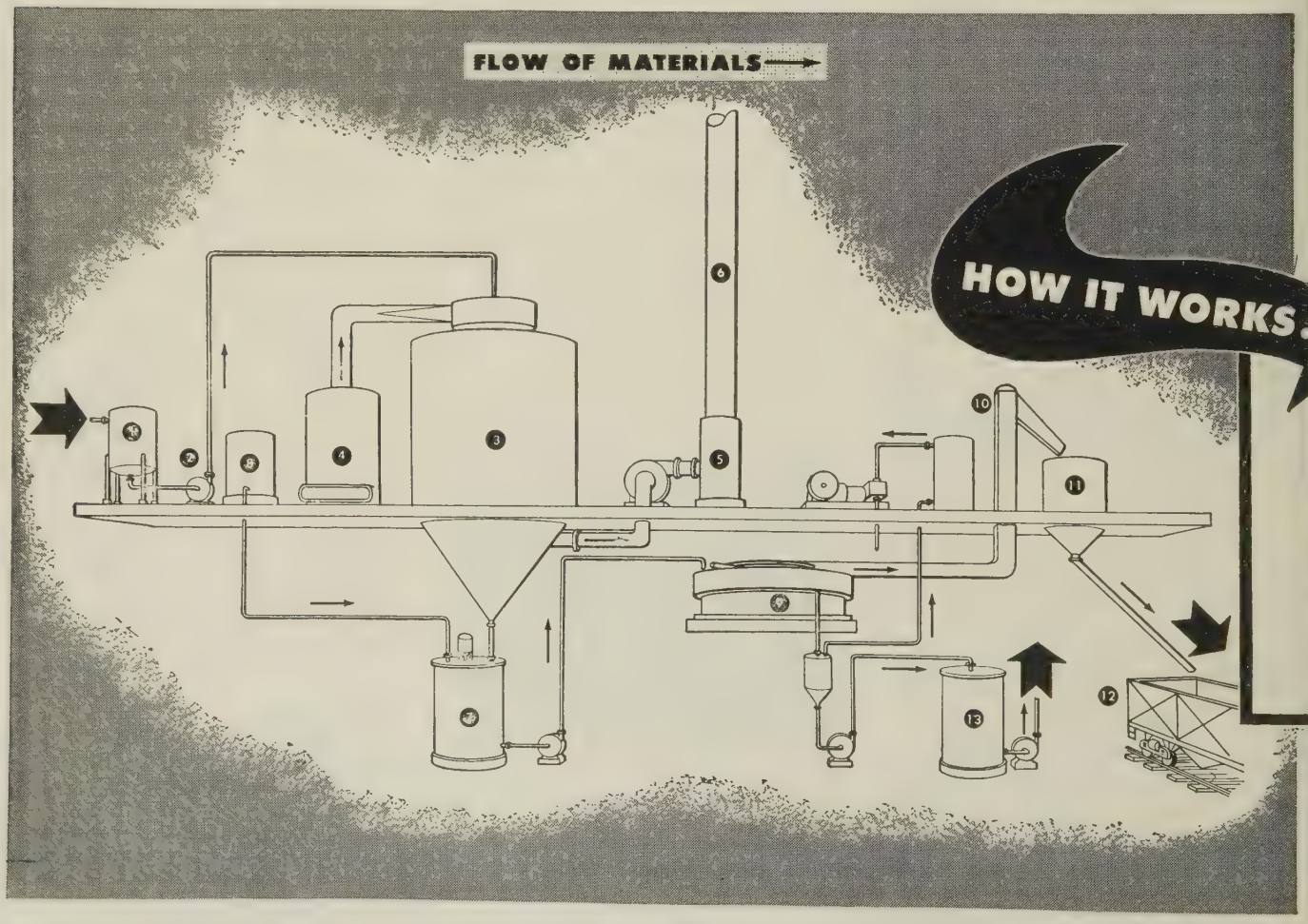
If you operate a

CUT ACID REQUIREMENTS

New continuous process, available from Koppers, of pickling acid used . . . and eliminates waste

FOR OVER A QUARTER OF A CENTURY, wherever a pickling line has been in operation, disposal of spent liquor has been a major headache. But now a new continuous regeneration process—the Koppers Inland-Zahn process— goes a long way toward solving this problem. This system is simple, it is economical, and *it has been proved in actual plant-scale commercial operation in Europe.*

With this process, the only make-up acid needed is the amount consumed in the pickling reaction plus normal losses. *All* available free acid in the used liquor is recovered (up to 50% of the original charge). Labor costs are low—just one man can operate the entire regeneration plant. As a result of these savings, operating costs are substantially below those of any presently available disposal method.



pickling line

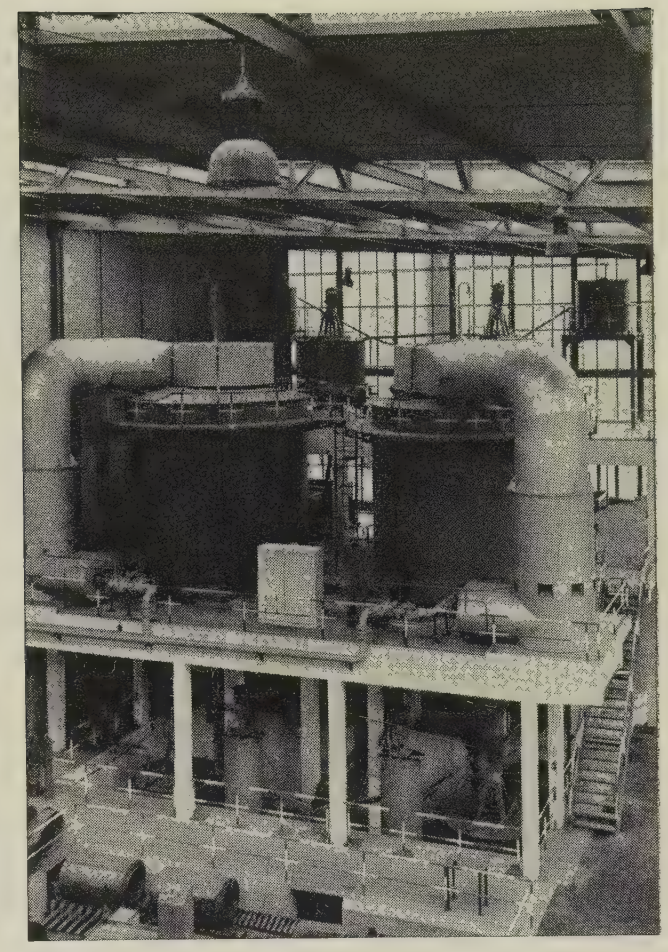
IN HALF!

regenerates up to half liquor disposal problem

PROVED COMMERCIALLY—This process, developed by Inland Steel Company and adapted commercially by Zahn & Co. of West Germany, is now being used successfully in three European steel plants. The benefits achieved include *extremely low maintenance* . . . and more uniform and *higher* acid concentrations in the baths. The latter advantage permits faster steel processing.

NEUTRALIZING PLANTS – The new regeneration process is especially applicable to plants handling 10,000 gallons of effluent, or more, a day. The Chemical Department of Koppers Engineering and Construction Division also designs and builds lime neutralization systems for both large and small pickling operations. Send the coupon for complete information about these and other Koppers Chemical Engineering Services.

Spent pickle liquor (1) is pumped (2) to spray head in an evaporating chamber (3). Here, hot air and flue gases from a combustion chamber (4) concentrate the liquor and cause the ferrous sulfate monohydrate to crystallize out of solution. Vapor laden air is discharged to atmosphere through a mist eliminator and stack (5 and 6). The slurry is dropped into a crystallizing tank (7) where fresh sulfuric acid is added from a metering tank (8). This causes more monohydrate to drop out. The slurry is then separated in a vacuum filter (9) and washed. Salt is conveyed to bins or hopper cars for sale or disposal (10, 11, 12). Mother liquor, containing about 35% acid and 1-2% iron, is pumped to a holding tank (13), ready for dilution and return to the pickling tanks. No reheating is required.



HEART OF THE SYSTEM—This spray dryer concentrates spent liquor to slurry of ferrous sulfate monohydrate crystals suspended in acid. The plant shown here, in Germany, has operated since June, 1954, processing 48,000 gallons per day of waste liquor.

GET ALL THE FACTS!

Koppers Company, Inc.
Engineering and Construction Division
1454 Koppers Building
Pittsburgh 19, Pennsylvania

I would like to receive literature on this new pickle liquor regeneration process . . . and also on Koppers other chemical engineering services. Please send the following:

- ☐ **Regeneration of steel pickling solutions by Koppers Inland-Zahn process.**
- ☐ **Lime neutralization of spent pickle liquor by Koppers.**
- ☐ **"3 Keys to Selecting Your Industrial Contractor," a brochure describing the variety of Koppers construction services and giving reasons why Koppers should build your next chemical plant.**

Name_____

Title_____

Firm_____

Address_____

City_____ State_____

KOPPERS

KOPPERS

CHEMICAL ENGINEERING SERVICES

pH CONTROLS . . .

too expensive to allow such usage.

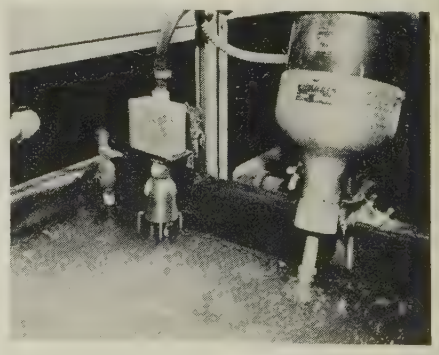
The second requirement was that effluent had to be neutralized to a legal pH level before it could be discharged into the borough sewage system.

Makeup Water — The makeup problem was solved by a system that continuously measures conductivity in each of the cold rinse tanks. Two Electromax controllers are used. When either bath becomes too acid, its controller opens a solenoid valve in the makeup supply line that adds water and brings the acidity back into line.

By adding makeup only when needed, the system holds water consumption to a minimum.

Effluent pH—Leeds & Northrup engineers also developed a system that effectively neutralizes process effluent. Before the acid rinse water is discharged into the sewer lines, it flows into a 6 x 3 x 2 ft retention tank installed behind the rinse tanks. Here, pH is continuously detected by a stainless-steel-mounted pH electrode assembly of the dip type. It translates pH into a proportional millivolt output.

The electrode output is fed to an industrial-type continuous pH indicator which amplifies the voltage and feeds it to a recorder-controller. The unit plots a 24-hour record of effluent pH and feeds a control signal to a valve drive mechanism that regulates the addition of caustic soda to the rinse water in the retention tank. Mixers agitate the solution so the caustic soda reagent is evenly distributed in the tank to bring the pH of the final effluent to a legal level of 7.5.



Dip-type pH cell at left senses effluent acidity in retention tank and signals controller to add caustic soda. Mixer at right agitates solution to assure representative sample

Just pick up your phone—

get price quotations, expert advice, prompt delivery

from your Superior Warehouse Distributor

Up against a tubing problem? Call your nearest Superior distributor. He's well stocked with quality tubing and information. Often he can make money-saving recommendations. Through his contact with the mill he can expedite information and orders for you. Let him show you why Superior tubing offers you real economy. Call on him today. He can save you valuable time and money.

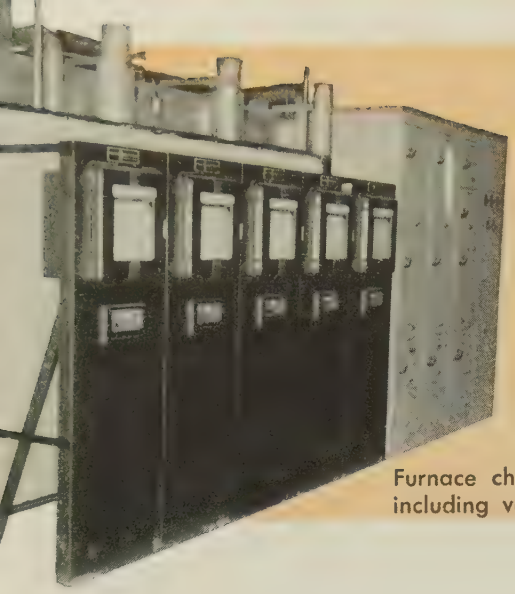
For general information on Superior tubing, get a free copy of Bulletin 40. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

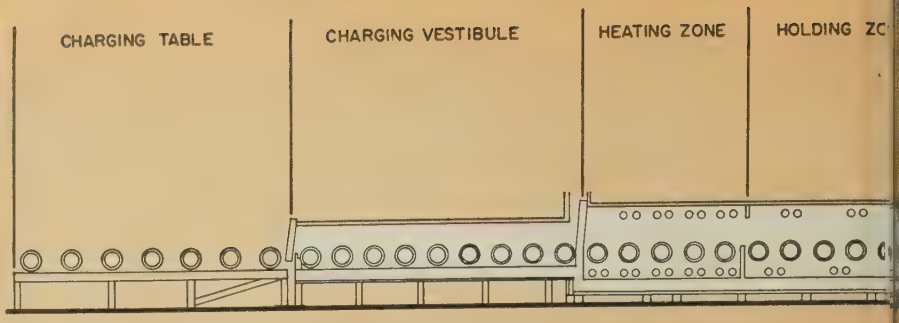
Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD





Furnace chamber is 70 ft long, with loading width of 7 ft. Over-all length including vestibules, loading and unloading tables is 115 ft

How To Get More From a Spheroidizing

New facility for alloy steel tubing uses a controlled roller hearth furnace. No time is lost in charging or discharging the load. Product has high uniformity

CYCLE ANNEALING of high carbon grades of alloy steel, such as 52100, requires considerable time to produce a spheroidized structure. Because of its uniform heating, the roller hearth furnace is desirable, but its capacity is limited by its length.

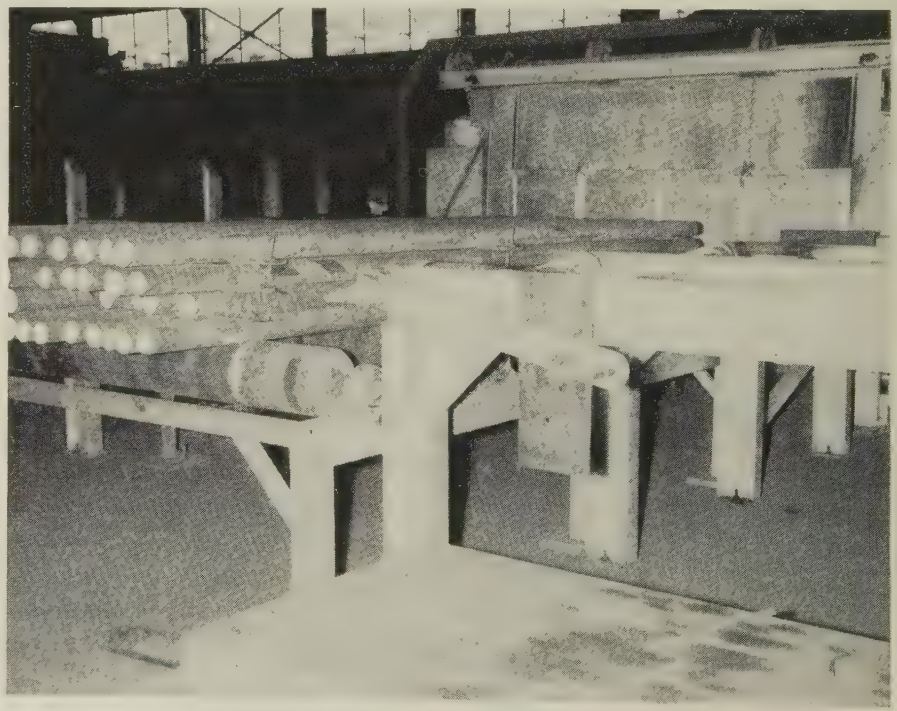
The Ohio Seamless Tube Div. of Copperweld Steel Co. uses a controlled atmosphere, roller hearth furnace. Capacity is increased by loading three or more layers of steel tubing to a height of 16 in.

Flat spacer bars are placed between each layer. Removable pins extending above and below the spacer bars (see photo at right) limit the width of the load to 7 ft. The furnace will handle a maximum load of 2100 lb per foot.

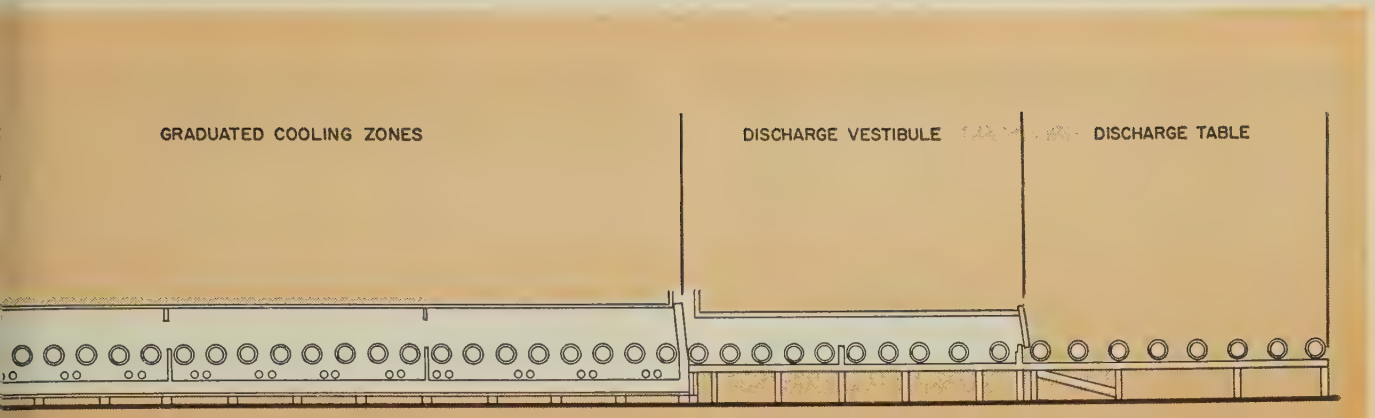
Ohio Seamless, which specializes in the production of seamless alloy steel tubing, chose this type furnace to get the spheroidized structure and hardness it wanted in the higher carbon grades.

Description—Olson Engineering Co., Pittsburgh, built the furnace. (Gas Atmospheres Inc., Cleveland, supplied the atmosphere unit.) Over-all length of the furnace is 115 ft. Its chamber is 70 ft long, 8 ft wide, with an effective loading width of 7 ft. At the entry and discharge ends are vestibules connected to the furnace with gastight doors. Outside the vestibule doors are loading and unloading tables.

Cast 25-12 alloy is used for furnace rollers. Each one carries two sprockets and is driven with continuous chains between adjacent rollers. The speed range is 1½



Flat spacer bars are placed between each layer of charge. Removable pins on the end of spacers limit the load to 7 ft in width



The furnace has five zones of temperature control; each zone has a strip chart recording controller. Control panels are shown at far left

Furnace

By W. B. LEYDA
Chief Metallurgist
and
WALTER J. ASSEL
Consultant
Ohio Seamless Tube Div.
Copperweld Steel Co.
Shelby, Ohio

to 11 ft per hour. But each end of the furnace has separate high speed drives so that the charge can be run in and out of the vestibule at 20 ft per minute.

The furnace is in continuous operation; no time is lost in charging or discharging the load.

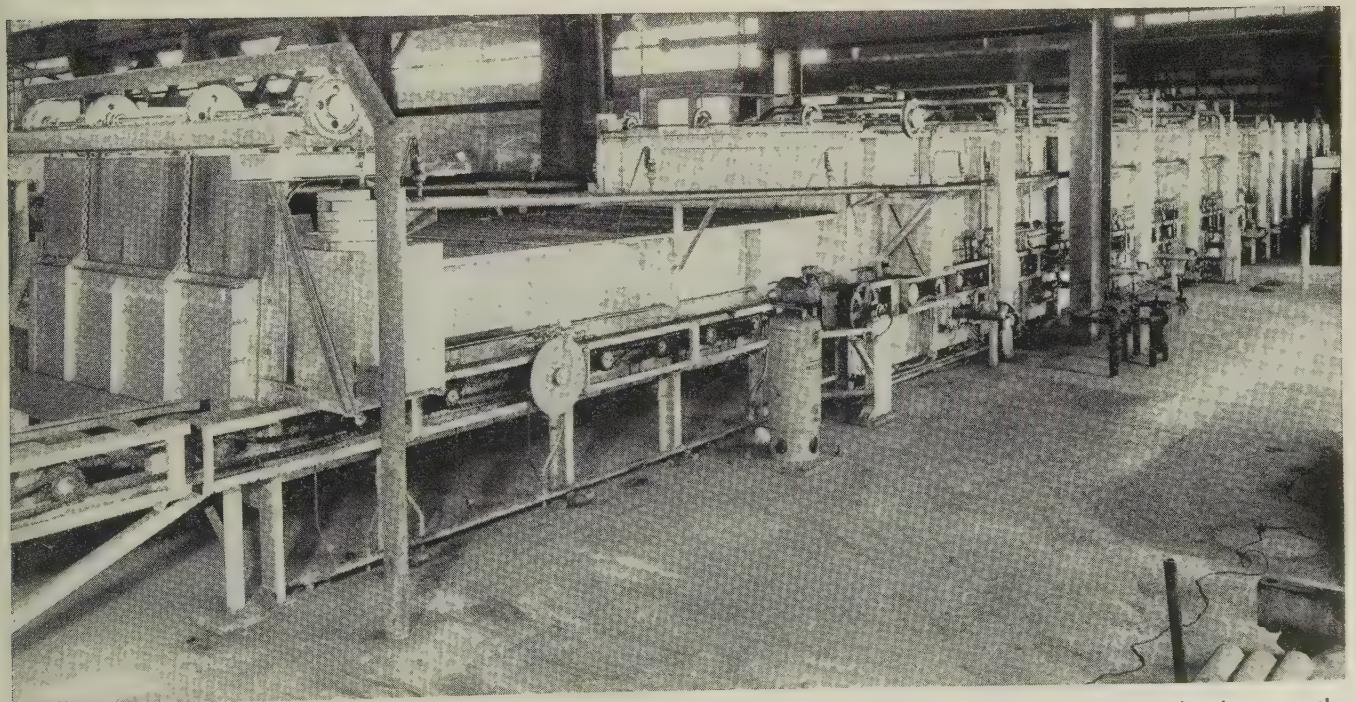
Sections—The furnace has five temperature zones; each has a strip chart recording controller. Dew point is maintained at less than + 5 degrees in the furnace.

The first two zones are heated with radiant U-tubes fixed both under and over the rollers. The last three zones have the heating tubes under the rollers only. Total heat input is 5 million Btu per hour. Maximum furnace temperature is 1700° F.

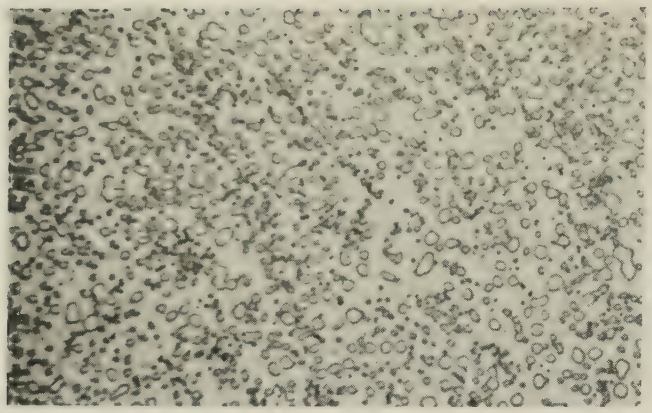
Cold air can be circulated through the radiant tubes to control cooling rate.

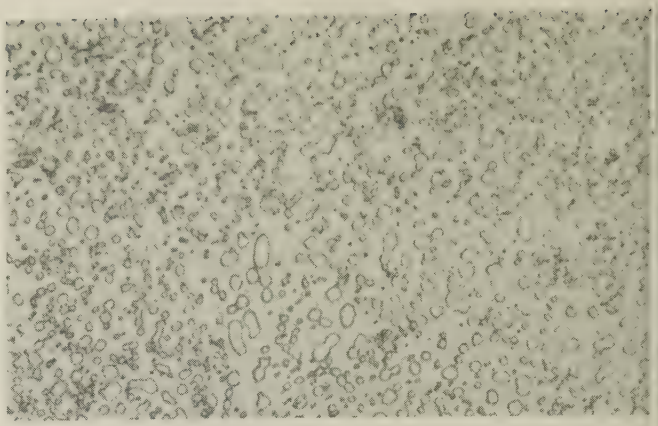
The nitrogen atmosphere comes from a 6000 cu ft per hr unit, equipped with both a refrigerant and activated alumina dryer. The dew point of the atmosphere leaving the generator is about − 40° F. Atmosphere is supplied to the vestibules so they can be purged before the furnace doors are opened. A pressure of about 0.10 in. of water is maintained in the furnace.

Adjustments can be made to use an enriched gas atmosphere to



Vestibules at both entry and discharge ends of the line have gastight doors to the furnace. The nitrogen atmosphere is supplied by a 6000 cu ft per hour unit





Structures and hardnesses throughout a charge are uniform. Microstructures above (X1000) are typical for spheroidized 52100. Brinell hardness of sample on right is 179; left, 187

keep surface decarburization to a minimum.

Operation—Here is the sequence for processing alloy tubes or bars:

A batch is arranged on the entrance rollers in layers not more than 16 in. high.

When a signal light indicates that the previous batch has entered the furnace and that the entrance door is closed, the operator opens the vestibule door. The charge is moved into the vestibule at high speed.

As soon as the front end of the charge trips a limit switch (which is ahead of the furnace entrance door), the charging roll speed is reduced to the preset cycle speed. The vestibule door is closed, and a timed purge period is started.

Next, the entrance door to the furnace is opened and the load advances at high speed until it is within 8 in. of the previous load, when the cycle speed takes over. After the tail end of the load passes a limit switch, the furnace entrance door closes.

An interlock makes it impossible to open the entrance vestibule door while the furnace entrance door is open.

Five Zones—The batch travels at a predetermined cycle speed through the heating zone, holding zone, and three graduated cooling zones. The schematic diagram shows the arrangement of the furnace zones (see Pages 208 and 209).

Photomicrographs on this page show typical spheroidal structures and hardnesses for 52100. The temperature for a charge of this alloy reaches about 1350° F in the heating zone. Depending on the weight of each charge, the speed of the furnace is adjusted to give the temperature-time relationship needed.

The company has found structures and hardnesses throughout a charge to be uniform and well within limits of specifications.

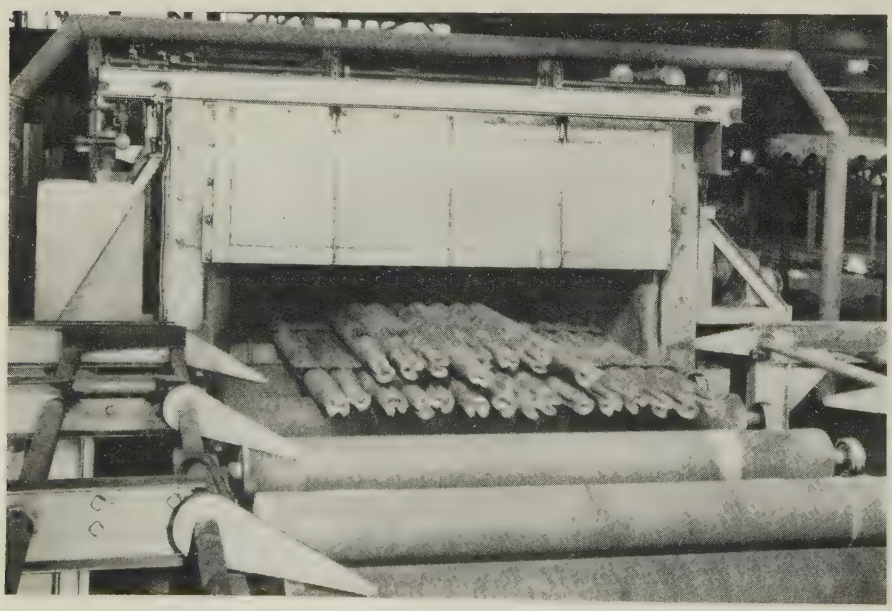
Removal—The load continues its travel at cycle speed into the already purged cooling vestibule.

When the trailing end of the load approaches the furnace discharge door, a limit switch actuates the high speed drive which moves the load into the vestibule clear of the door. A limit switch actuates the door closing mechanism and reduces travel of the charge to cycle speed again.

The load can be held in the vestibule until another charge is ready, giving it additional slow cool time, or it can be moved at high speed onto the discharge table.

As the load goes on the discharge table, its front end strikes a final switch which stops its movement and closes the vestibule door. When the door closes, the vestibule purge cycle starts automatically.

Versatility—Although the main job of the new furnace is to produce the required spheroidized structure and hardness, it's designed so that full anneal structures and hardnesses can be obtained. They require heating above the upper critical point with a slow cool to meet a specification.



Charge of tubes, stacked two-high, enters furnace line. A variable speed drive gives speed range of 1½ to 11 ft per hour

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

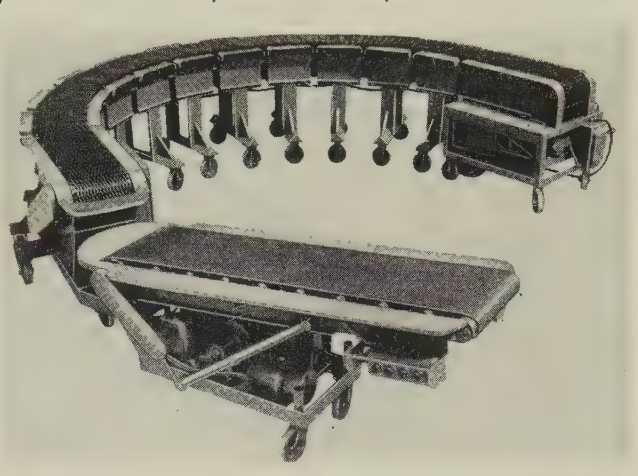
Portable Conveyor Raises, Lowers, and Bends

The Flex-Bend bends horizontally in either direction to carry materials around stationary objects. A 6-ft boom can be raised or lowered by pushbutton to any height from 18 to 72 in. The boom swings 90 degrees to the right or left.

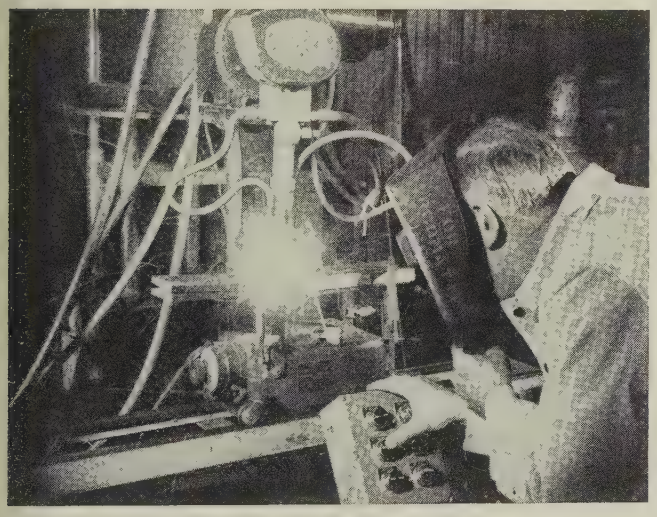
Standard units include a power stacker car, belt drive car, power traveler car, and any number of center cars.

An electric motor in the traveler car powers forward and reverse travel of the entire conveyor and stacker.

Steel mesh belts are available in 12 and 18 in. widths. *Write*: Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich. *Phone*: Webster 3-8010



Welding Head Feeds Heavy Welding Wires



Model AMH-C is used for the heavier, production applications of automatic machine welding.

Capacity for aluminum wire is 3/64 to 1/8 in., hard wires 0.045 to 1/8 in. Wire feed speed can be adjusted up to 600 ipm by a calibrated governor which regulates a 1/3-hp drive motor.

The welding head can be rotated through 360 degrees from a portable remote control station.

The machine barrel is rated at 600 amperes on a 100 per cent duty cycle.

The welding head is used with the Aircomatic process, an inert-gas shielded welding system in which spooled wire, the consumable electrode, is automatically fed into the weld pool. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

Boring Machine Spindles Are Mounted Independently

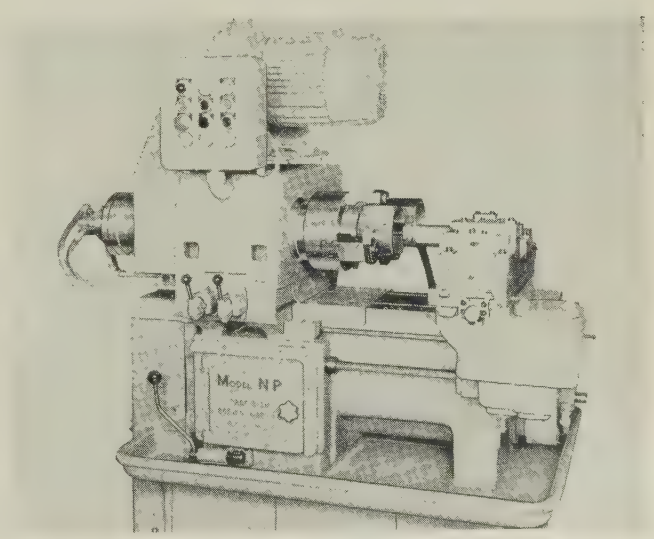
Model NP can be used with one or more precision spindles mounted on a fixed bridge. They can be driven by separate, balanced motors or by a single motor with a tandem drive.

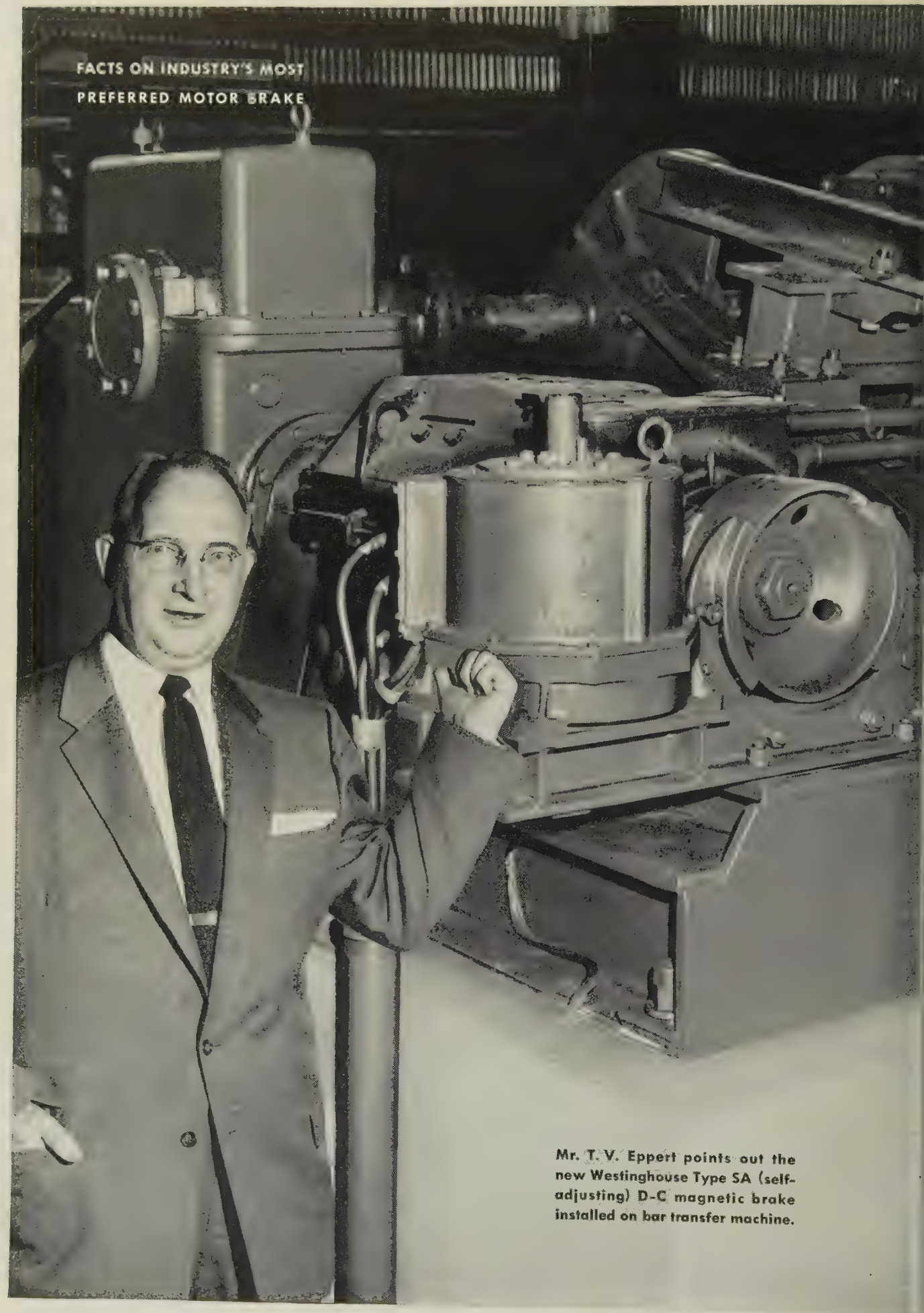
Three types of spindles are available: Low speed (up to 2500 rpm), medium speed (up to 5000 rpm), and high speed (up to 10,000 rpm).

Variations in the length of carriage stroke, rapid traverse, and feed cycle can be made without changing cams. Average changeover time is less than ½ hour.

Parts may be rotated in fixtures on the boring spindles and the tools mounted on the table, or the part can be held in a fixture on the table and the tools rotated.

The machine has a 16-in. swing over the table. *Write*: Seneca Falls Machine Co., Seneca Falls, N. Y. *Phone*: 701





Mr. T. V. Eppert points out the new Westinghouse Type SA (self-adjusting) D-C magnetic brake installed on bar transfer machine.

FACT:

Brake shoe adjusting eliminated with this new SA* motor brake

The self-adjusting feature of the new Westinghouse type SA, d-c magnetic brake in itself will bring your brake maintenance costs to their lowest levels. And that's just part of the story.

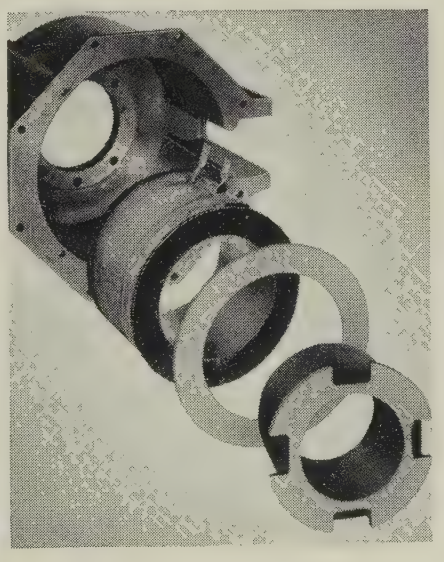
There are many added cost-cutting features of the type SA described completely in Booklet B-6548.

Get it from your Westinghouse sales engineer or write Westinghouse Electric Corp., 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

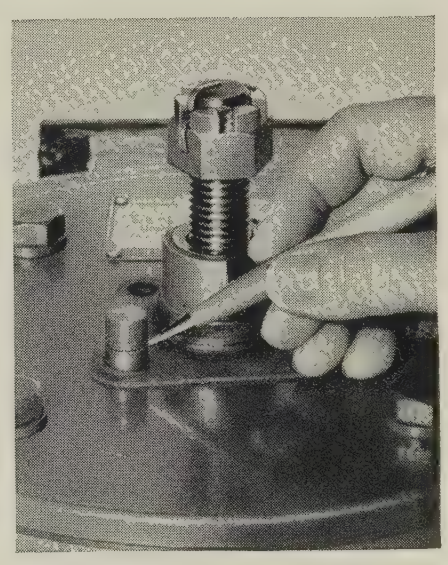
J-21907

*** Self-adjusting**

Lining life is increased because the self-adjusting brake shoe feature keeps both shoes in correct alignment with the wheel at all times. Shoe tips cannot drag—wheel scoring is minimized.



Magnetic housing is easily removed for coil accessibility. Coils can be repaired on the spot. No need to return them to the factory. Housing will hold either shunt or series coils.



Torque rating scale, stamped on spindle, takes the guesswork out of torque setting. Rated torque is factory-set and needs no changing. A clockwise turn reduces torque.

YOU CAN BE SURE...IF IT'S

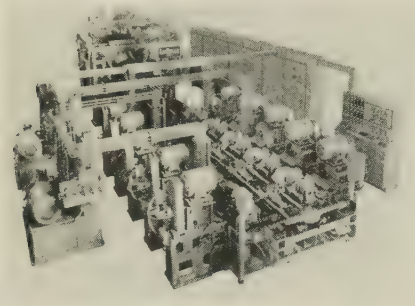
Westinghouse

NEW PRODUCTS and equipment

Multistation Machine

This machine performs 46 operations on an automotive rear axle housing in 26 seconds.

Spindles are built to accept preset tools. All sections and working tools are accessible.



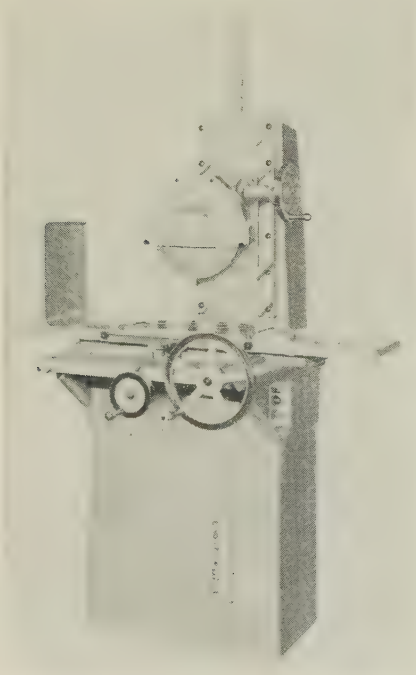
The finished housing is machined to handle either the conventional or air-ride suspension.

Individual regulators provide coolant at every tool used in the machine. *Write*: LaSalle Tool Inc., 3840 E. Outer Dr., Detroit 34, Mich. *Phone*: Twinbrook 2-1525

Surface Grinder

Capacity of this tool is 10 x 16 in. A 1-hp motor drives the spindle. The grinding wheel is 12 in. in diameter.

The back edge of the table and the T-slots are ground square to the spindle and can be used for aligning work.

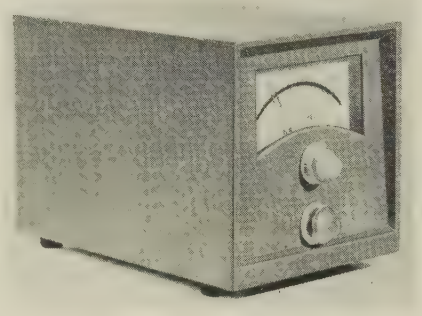


All feeds are by hand. One revolution of a handwheel moves the table 6 in. *Write*: Harvel Co., 5135 Coffman-Pico Rd., Pico, Calif. *Phone*: Parkview 1-8666

Proportioning Control

Temperatures from −200 to 3000° F are controlled accurately by this unit. Total spread can be as little as 1° F.

The use of electrostatic attraction across the contact of the meter-relay is responsible for the accuracy of the control. The attraction is used to proportion the amount of time the heat is turned on and to cause an anticipated, or premature, closure of the contacts before the limit point is reached by the signal pointer. This anticipation keeps the cumulative effect

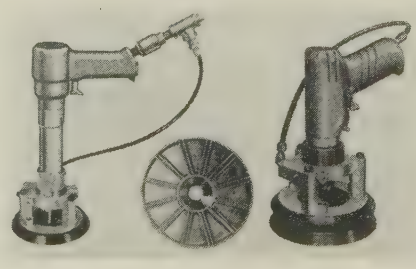


of a heat buildup from raising the temperature past the limit. *Write*: Assembly Products Inc., Chesterland, Ohio. *Phone*: Hamilton 3-4436

Vacuum Foot

Hand drills, rivet hammers, power screw drivers, and other portable tools can be clamped firmly to surfaces despite drilled holes, joints, or other surface irregularities by this doughnut-shaped vacuum foot. Its multicellular construction effectively seals off and isolates work surface leaks such as drilled holes.

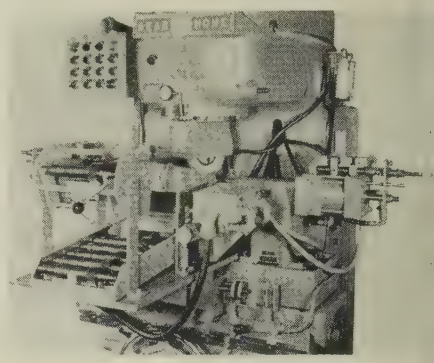
Recoil action of the primary tool is completely absorbed and held by the vacuum foot. The tool is stabilized so that surface marring,



misdrilling, or other damage to the work is eliminated. *Write*: Winslow Product Engineering Corp., 47 St. Joseph St., Arcadia, Calif.

Gear Loader

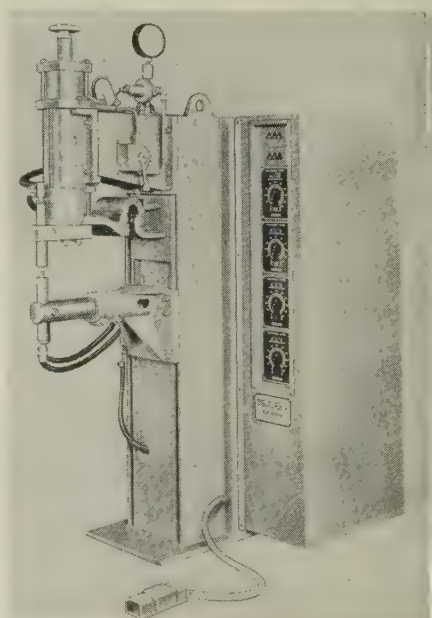
Long shaft and unsymmetrical gears are handled by this rocker-type automatic loader. It can be used with gear tooth honing machines or rotary gear shaving machines.



An assembly of grip fingers in both the input magazine and discharge chute keeps the gears from touching each other and eliminates the cocking of parts that can result from the greater weight of one end of unsymmetrical, long-shaft gears. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Spot Welder

SP 1 is a low impedance, single-phase welder that covers a wide range of commercial welding ap-



STEEL SETS THE PACE in farm equipment...

Farm Equipment manufacturers used 1,082,459 tons of steel last year.
Steel is the **most used metal** in modern technology.

J & L sheet steel sets the pace in helping you control PRODUCT QUALITY

As an integrated company, Jones & Laughlin controls quality from iron ore through every production operation. Rigid quality control of J&L sheet and strip steel assures formability, uniformity and top drawing qualities to meet your most exacting specifications.

J&L sheet and strip are supplied in hot or cold rolled coils and cut lengths, in carbon grades, in widths up to 90″ dependent upon gage. This permits forming products in one piece, eliminating welds and permitting more modern styling. Wide widths can also be supplied in high tensile, low alloy grades where higher strength or reduction in section is required.

Write for complete information to Jones & Laughlin Steel Corporation, Dept. 404, Three Gateway Center, Pittsburgh 30, Pennsylvania, or call your local J&L district office.

J&L STEEL

Jones & Laughlin

...a great name in steel

plications. It is operated by air.

The welder illustrated is available in 30, 50, and 75 kva ratings at a 50 per cent duty cycle. It is furnished with an 18, 24, 30, 36, or 42 in. throat depth.

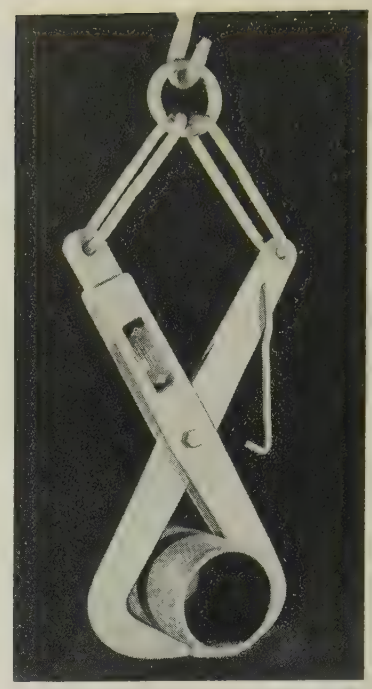
Electrode force up to 1575 lb is provided by 80 psi line pressure. *Write*: Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill. *Phone*: Portsmouth 7-5600

Tongs

Rounds and odd shapes can be lifted by these nonautomatic tongs.

A link at one side holds the jaws open when the tongs are lowered for a lift. This link is dropped out of position instantly by allowing a bit of slack in the line. Then the jaws close firmly on the part and lift it safely.

Rounds from 2 to 9 in. in diameter can be lifted by the 750-lb capacity tongs. The 1000-lb capacity

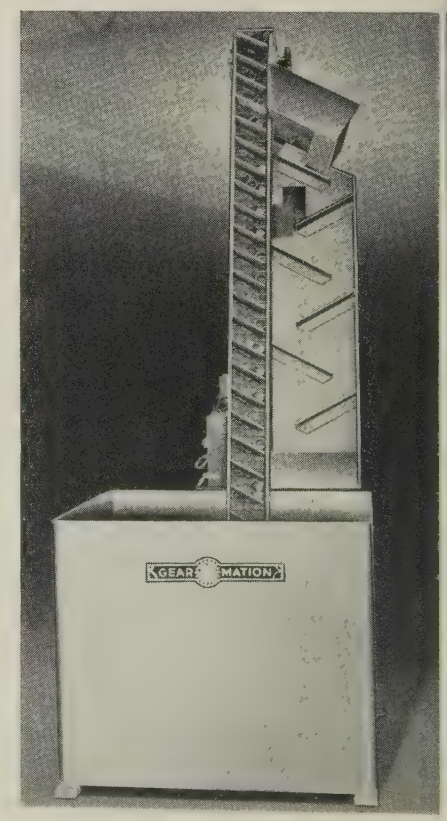


tongs will move rounds from 4 to 12 in. in diameter. *Write*: Heppenstall Co., Fifth Avenue and 16th Street, New Brighton, Pa.

Parts Elevator

This unit lifts parts automatically in automated production lines. It also face-orients parts and feeds them into distribution systems. Production rate is about 3600 parts an hour.

Any part that rolls or slides can

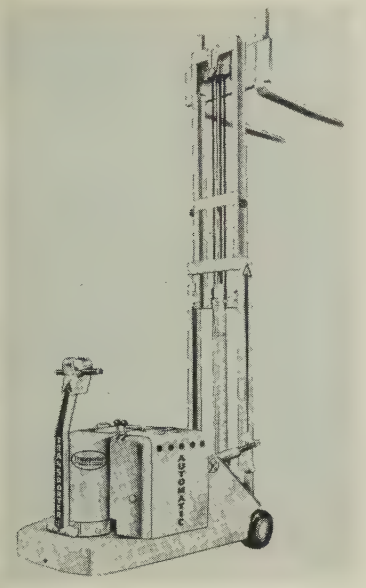


be handled by the equipment. The feeders are tailored to a specific installation but assembled from standard components.

Parts are loaded by the machine from its hopper. *Write*: Gear-O-Mation Div., Michigan Tool Co., 7173 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Fork Lift Stacks High

This walkie-type truck can lift 135 in. with its 83.-in. uprights. Models WST-20, WST-25, and WST-30 have rated lifting capacities of 2000, 2500 and 3000 lb. (Model WST-30 lifts 132 in.)



Each model has a backward tilt of 18 degrees and a forward tilt of 3 degrees.

Flow control valves regulate descent of forks should the hydraulic lines break.

Either of two types of lift is available. The monolift has 15 in. of free lift; the duolift offers 68 in. of free lift. *Write*: Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

Turning Rolls

The R-500 rolls are used to rotate tanks and vessels being welded by manual or automatic processes.

Speeds are infinitely variable from 5 to 40 ipm. Diameters from 6 in. to 14 ft can be handled.

Separate power and idler units make the rolls portable and make possible handling of practically any length workpiece.

The R-500 takes vessel weighing up to 50,000 lb, the R-1000 up to 100,000 lb, and the R-1500 up to 150,000 lb.

All models are equipped with 18 in. diameter rubber tired wheels. Face width of the wheels increases with the roll's capacity. *Write*: Webb Corp., Webb City, Mo.

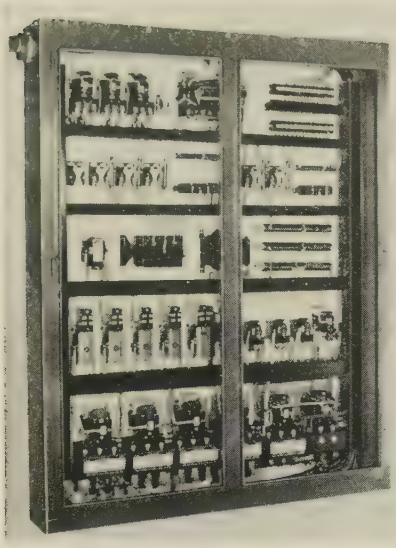
Control for Hoists

Easy, safe, accurate handling of loads is provided by this control for alternating current hoist motors.

It uses full magnetic control and an eddy-current brake.

Excitation of the eddy-current brake is controlled automatically by the motor speed. For fast acceleration, the master switch eliminates excitation of the eddy current.

Speed curves are easily changed. *Write*: Northern Engineering

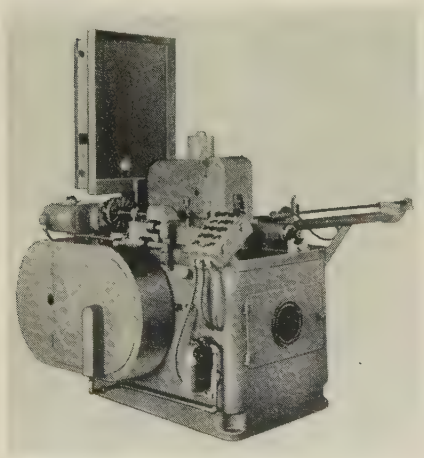


Works, 210 Chene St., Detroit 7, Mich. *Phone*: Lorain 7-3280

Cutoff Machine

More than 6000 pieces of tubing an hour can be cut off by this machine.

It will handle tubing with an outside diameter of 2¼ in.



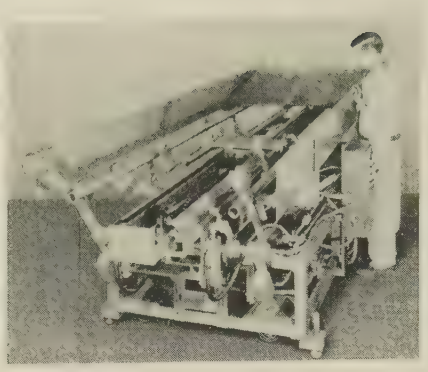
There is no distortion of the tube, and deburring is not necessary for most applications.

An air mist cutting oil system is used to lengthen cutting blade life. *Write*: Grieder Industries Inc., Bowling Green, Ohio.

Press Feeder

Large stampings are unloaded, transferred, and fed by this slide-type combination unit. The stamping is under control at all times.

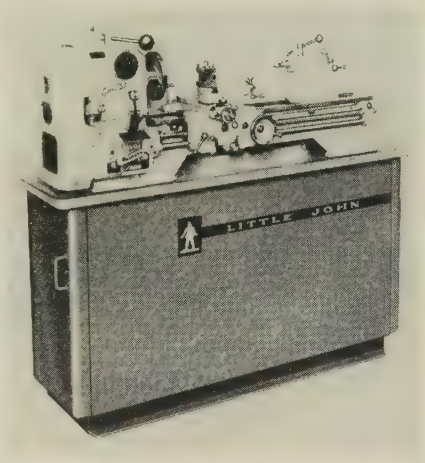
The portable unit has a carriage that travels back and forth on



horizontal slides. The unloader unit is mounted at the rear of the carriage, and the loader unit is mounted at the front. The unit is tied in with the press controls. *Write*: Press Automation Systems Inc., 25418 Ryan Rd., Centerline, Mich. *Phone*: Jefferson 9-7750

Lathe

The Little John has a 10¼-in. swing and admits parts 24 in. long between its centers. The spindle bore is 1-1/32 in.



Spindle speeds range from 38 to 1750 rpm. A quick change gearbox covers a range of 4 to 60 threads per in.

Four special gears are provided to cut metric threads.

The tailstock can be offset for turning small tapers between centers. *Write*: Wickman Products Corp., 10325 Capital Ave., Oak Park 37, Mich. *Phone*: Lincoln 6-3737

Portable Elevator

High machine assembly operations are simplified by this double-telescopic elevator. It can be stopped at any height by pushbutton controls on the platform or at the base.

The elevator is operated by an

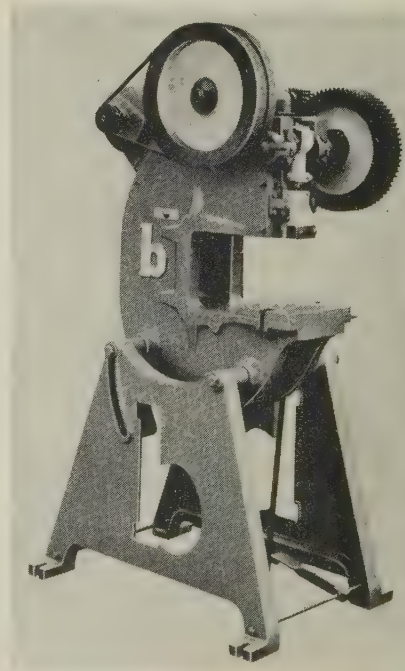
electric motor and a steel cable winding drum. It is anchored by safety floor locks on three sides of the base. *Write*: West Bend Equipment Corp., 335 Water St., West Bend, Wis.

Deep Drawing Press

This 10-ton press is suited to deep drawing, necking, expanding, and other jobs where metal flow, rather than shearing, is desirable.

The press has back gearing which prolongs the inertial force (developed by an oversize flywheel) over a long ram stroke and also slows the ram speed.

Three shut heights are available: 7¾, 10¾, and 13¾ in. The ram

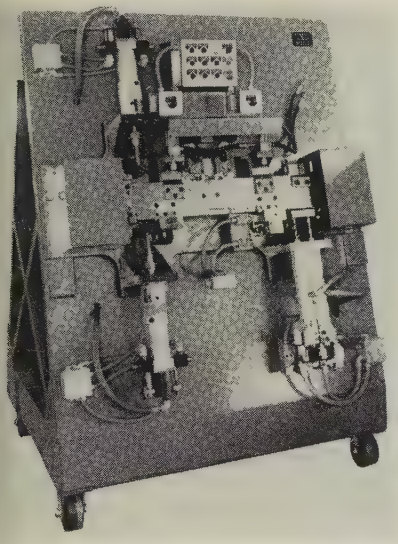


center is 12 in. from the nearest frame member, which permits working to the center of a 24-in. circle.

Flywheel speeds usually are specified between 40 and 100 rpm. *Write*: Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif. *Phone*: Faculty 1-0411

Automatic Drilling

This automatic unit drills and countersinks six holes in diecast radiator grilles. Indexing of the part is necessary because close spacing of two sets of holes is required. The work cycle can be completed in about 4 seconds.



Pneumatic controls are provided for each drill unit. Slide and clamps have controls for individual speed adjustment. *Write*: J. C. Thompson Tool & Die Inc., 3000 Engle Rd., Ft. Wayne, Ind. *Phone*: Harrison 2301

Inert Gas Welding

The Carryall is used for large operations where inert gas, shielded arc welding equipment is needed at different stations.

The unit saves time by allowing the operator to change inert gas welding stations without installing water lines or changing hose connections.

An independent water supply cools the inert gas welding torch. Water is held in a baffled 20-gal

(*Please turn to Page* 226)

Painting is easier with a bucket which has a dependable, easy-to-use handle made from low carbon, hard drawn CF&I-Wickwire Pail Bail Wire.

Chances are you don't need pail bail wire to make paint bucket handles. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

the painter's helper

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

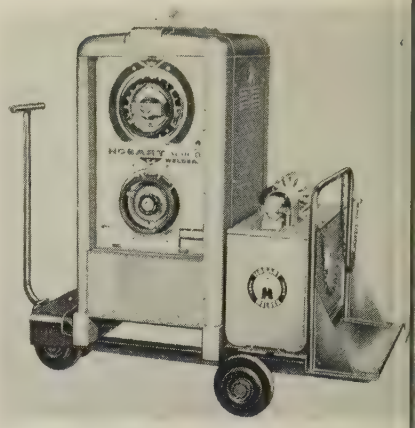
MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Montreal • Toronto
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

4243

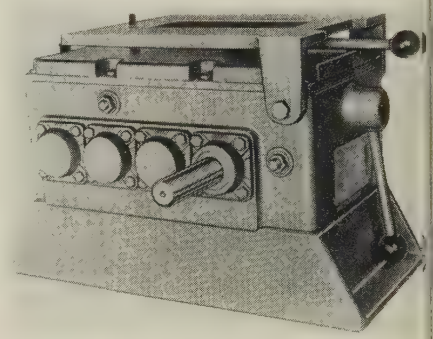


tank made of terne plate. A rotary gear pump (1/3 hp) is mounted on the removable top of the tank. *Write*: Hobart Bros Co., Hobart Square, Troy, Ohio. *Phone*: Federal 2-1223

Transmissions

Models 240 and 540 are selective gear transmissions that permit electric motors or gasoline engines to operate at their most efficient speeds.

The two models offer four, six and nine ranges of speed. Standard high to low output ratios vary



from 4.7:1 to 8:1, with a maximum 12.4:1 stepdown. A stepup ratio of 1:8 is possible in certain applications.

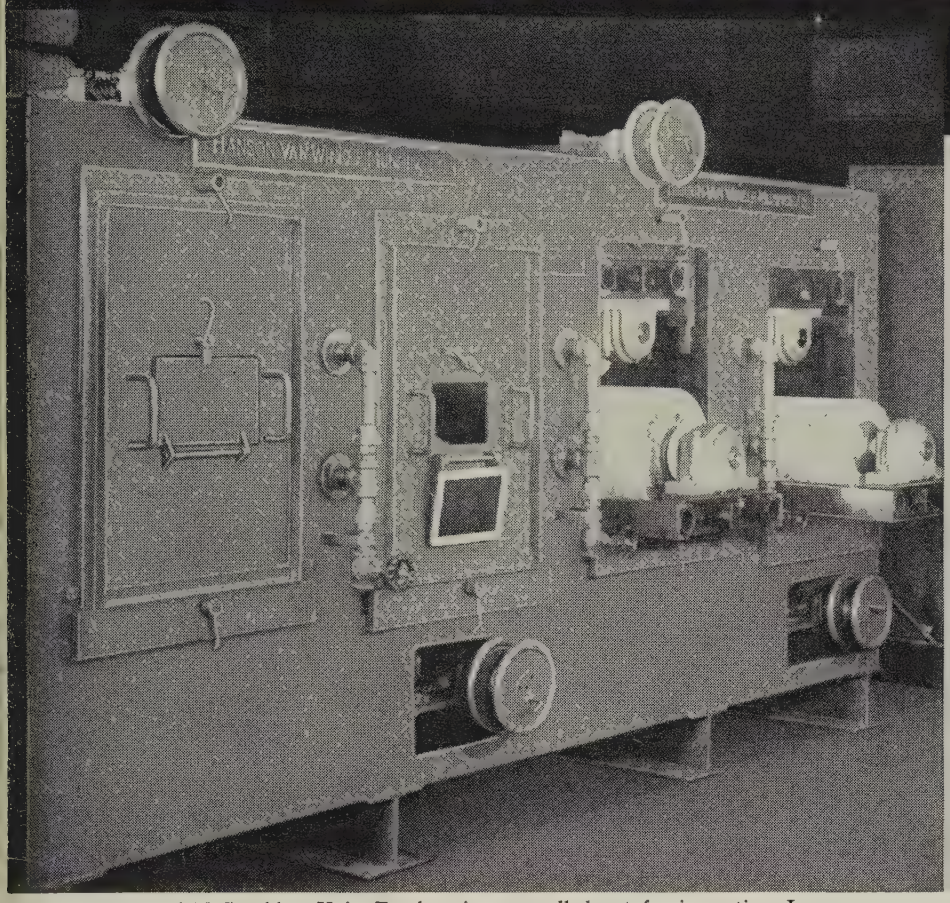
Standard units are available in 1 to 60 hp capacities. *Write*: Turner Uni-Drive Co., 3402 Terrace St., Kansas City 8, Mo. *Phone* Logan 1-6800

Piston Inspector

This four-station machine automatically feeds, gages, and inspects 1800 automotive pistons an hour.

The machine inspects the piston

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running.* Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal.

Ⓡ 3149

Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today.

Hanson-Van Winkle-Munning Co., Matawan, New Jersey. Offices in principal cities.

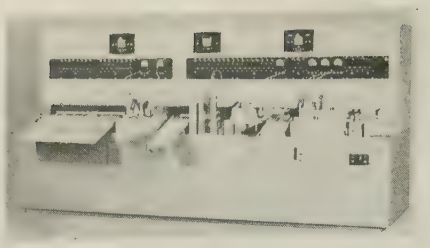
H-VW-M

PLATEMANSHIP —Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.

pin holes for alignment, distance of bored holes to piston face, dimension of outside diameter between predetermined points, and the bore diameter. The size of the piston is automatically printed on its face for selective fit assembly.

Each station of the machine is controlled individually by an electronic cybernetic system. It anticipates the requirements of the machine and controls the flow of parts from station to station, and action in and out of each station.



Gage heads operate on a radar-type reflected wave circuit. The gages operate to 0.000001 in. and there is no wear. Rejected parts are diverted into a chute. *Write*: Arlin Products Inc., 13541 Auburn Ave., Detroit 23, Mich. *Phone*: Vermont 8-4473

Sweeper

Model 40 is 33 in. wide and sweeps narrow aisles where mechanized sweeping was previously impossible. It's designed for congested core rooms, foundry areas, and around ovens and furnaces.

An 11-in. fan sucks light dirt and dust into a fabric bag. Heavy litter is picked up by the main brush and thrown into a removable hopper. The brush follows floor contours and has a pressure adjustment for heavy soilage areas.

A variable speed (0-3 mph) enables the unit to sweep clean around machines, boxes, and in narrow aisles. *Write*: G. H. Tennant Co., 721 N. Lilac Dr., Minneapolis 22, Minn. *Phone*: Liberty 5-3771

Press Feeder

The Transflo feed is used to transfer small parts (up to 8 lb) through a single press or through a line of up to six presses.

The feed consists of a power unit and an intermediate unit for

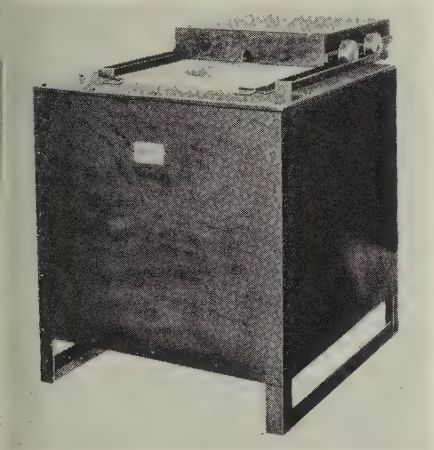
each press in the line.

The complete transfer finger bar assembly can be replaced with an assembly that has been preadjusted to accomodate different parts.

The feed can be used with presses of 45 to 200 tons. Pieces 37 in. from front to back can be cleared by the press. The other dimension is limited only by the length of the feed stroke. *Write*: Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill. *Phone*: Portsmouth 7-8700

Salt Bath Furnace

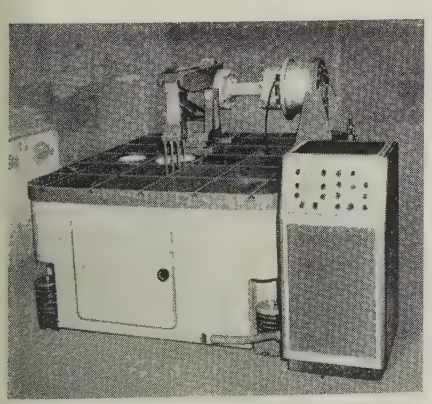
The Series 2055 furnaces prevent oxidation, scaling, and decarburization while operating at peak production with unskilled labor.



Ten sizes are available. Maximum heat is 1700° F. *Write*: Lucifer Furnaces Inc., Neshaminy, Pa.

Fatigue Testers

The I-V series of fatigue testing machines provides both high force and high amplitude loading stations. Tests can be made at room and high temperatures.



The machines can test specimens under loads ranging from 50 lb (lowest capacity in the smallest machine) to 120,000 lb (highest capacity of the largest machine). Multiplying fixtures increase the capacity of each machine five times (to 600,000 lb in the case of the largest machine).

The machines are used for testing machine members, components, and structural assemblies as well as for performing fatigue tests on specimens for research and evaluation.

Mechanical and electrical limit adjustment make it possible to stop most tests before complete specimen separation so that the region of crack initiation can be analyzed.

A counter registers the number of cycles of dynamic load the test piece has sustained. *Write*: Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham, Mass. *Phone*: Twinbrook 4-6700

NEW literature

Write directly to the company for a copy

Optical Comparators

Catalog 5700, 36 pages, describes features and charts to be used with comparators. Jones & Lamson Machine Co., Springfield, Vt.

Grinding Wheels

Features of vitrified and resinoid grinding wheels are described in this 16-page bulletin. Sales Promotion Dept., Simonds Worden White Co., 1101 Negley Place, Dayton 7, Ohio.

Press Modernization

Bulletin 45, 16 pages, tells how old or worn side and gap frame presses can be improved by modernization and conversion assemblies. E. W. Bliss Co., 1375 Raff Rd. S.W., Canton, Ohio.

Arbors and Collets

Bulletin WA-10, 30 pages, describes extension arbors (250 styles and types) and tapered shank collet chucks for internal grinding spindles and milling spindles. Pope Machinery Corp., Haverhill, Mass.

Mobile Machine Shops

Truck mounted units for repair and maintenance are described in Bulletin E-208, 4 pages. Davey Compressor Co., Kent, Ohio.

Centrifugal Fans

Efficiency and quietness of airfoil blading in a series of fans up to 700,000 cfm and 16¾ in. total pressure are described in a 12-page bulletin, 1121. Dept. T-406, Sturtevant Div., Westinghouse Electric Corp., 200 Readville St., Hyde Park, Boston 36, Mass.

Welding Control

Bulletin GET-2683, 12 pages, describes standard components comprising nonsynchronous welding control to assist users in selecting equipment and determining connections. General Electric Co., Schenectady 5, N. Y.

Fork Lift Truck

This 4-page bulletin describes trucks with lifting capacities from 12,000 to 20,000 lb that use compensating linkages instead of upright channels to lift loads. Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill.

STEEL

December 9, 1957

Market Outlook

FOURTH quarter order volume is disappointing, but there is hope for a modest upturn in steel buying in 1958's first quarter. No sales pickup is expected in December. In fact, business will probably slacken as the Christmas holidays approach.

INVENTORIES SHRINK—Consumers are displaying more dependence on their stocks, ordering largely for emergency and spot requirements. Prompt mill shipments encourage delays in covering forward needs. Declining inventories should mean more active buying in early 1958.

ENCOURAGING FACTORS—The current dull market is not without its encouraging facets. Tin plate demand for the first quarter is shaping up better than had been expected. Automotive needs also are being placed right along, and while tonnage is disappointing so far, first quarter placements should be up substantially.

QUICKENING AWAITED—No gain is noted on appliance account, but appliance production is believed to have reached bottom. Implement tonnage should expand soon. Construction, off seasonally, should rise next quarter. Contracting railroad demands should be offset partially by growing shipbuilding activity. Defense needs may broaden as 1958 advances.

CONSUMER GOODS—Most steelmen are looking to consumer goods, notably automobiles, to generate sufficient demand early in the new year to support steelmaking operations at a profitable level. Expectations are requirements on heavy durable goods account will continue to shrink for some time.

WAREHOUSES LAG—Reflecting the sluggishness in business, warehouse sales are off 15 to 20 per cent from last year's. December volume will fall under November's, partly because of the holidays. Distributors' stocks are adequate, and there is a tendency to shave inventories.

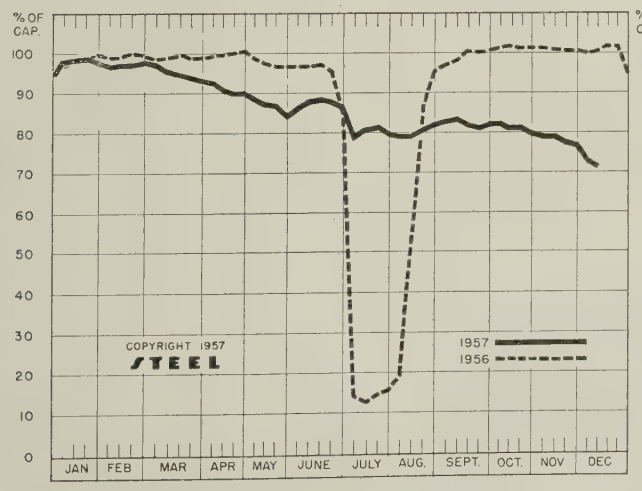
PRODUCT PICTURE—Only heavy plates are in tight supply—and they are easier to get than they were. Sheets can be had for the asking. So can bars and wire. Structurals are more readily available. Pig iron is plentiful.

PRICES WATCHED—Except for the disappearance of premiums, no sign of any easing in mill prices has appeared. But warehouse quotations are giving way to pressure. On the West Coast, distributors have cut quotations across the board. Some mills are taking lots that formerly went to jobbers. More freight is being absorbed.

SCRAP SLIDING—The slump in scrap continues, mirroring the steady decline in steel production. STEEL's composite on No. 1 heavy melting grade last week eased another 67 cents to $32.33, a new low since mid-October, 1954. The finished steel composite is unchanged at $146.03.

PRODUCTION—Steelmaking operations dropped 2 points last week; the national ingot rate was at 71.5 per cent of capacity, the equivalent to production of about 1,830,000 net tons weekly. Except for holiday and strike periods, it is a new low since autumn, 1954. The rate will probably fall more over the holidays.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 8	Change	Same Week 1956	Same Week 1955
Pittsburgh	75.5	+ 2.5*	98	101.5
Chicago	74.5	0*	98.5	99
Mid-Atlantic	82	0	101	99
Youngstown	71	0	104	100
Wheeling	60.5	— 0.5	102	100
Cleveland	70.5	+ 4*	107.5	98.5
Buffalo	63.5	—14.5	107.5	105
Birmingham	61.5	— 2	94	94.5
New England	52	— 1	76	89
Cincinnati	73.5	— 8	92.5	91.5
St. Louis	75.5	—12	104.5	103.5
Detroit	89.5	+ 0.5*	99.5	99
Western	84	— 2	103	103
National Rate	71.5	— 2	100.5	99

INGOT PRODUCTION‡

	Week Ended Dec. 8	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	114.7†	114.9	124.3	155.2
NET TONS (In thousands)	1,843†	1,846	1,996	2,493

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—Page 107

Technical Outlook—Page 155

A welder caused us to caucus

The note from an employee suggesti box read "How come a company like th hasn't got the U. S. Savings Bond Pa roll Savings Plan". It was signed by welder in the fabricating department.

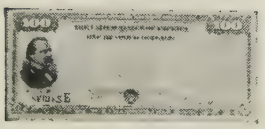
Since we actually *do* have Payroll Sa ings this told us two things: (1) Probab more employees than we imagined want the advantage of buying U. S. Bon automatically through Payroll Saving (2) We had grown lax in bringing o Plan to their attention.

But what to do? The solution w simplicity itself.

We called in our State Savings Bon Director. He provided all the promotion materials needed to arouse interest U. S. Savings Bonds. Then he helped conduct a personal canvass and place a application blank in everyone's hands.

The results were amazing. Employe participation shot up to a percentage tha we could take pride in. There was n "hard selling", nor was work interrupte Our people wanted the security U. Savings Bonds offer them.

Today there are more Payroll save than ever before in peacetime. Your Sta Director will be happy to help you insta a Payroll Savings Plan or build enro ment in one already existing. Look hi up in the phone book or write: Savin Bonds Division, U. S. Treasury Dep Washington, D. C.



STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABO

Ore Shipments Top 1956's

(Millions of gross tons)

LAKE SUPERIOR (including Canada)		OTHER U.S.		IMPORTS (including all from Canada)	
1957[1]	1956[2]	1957[1]	1956[3]	1957[1]	1956[4]
84.6	77.6	20.0	21.8	32.0	30.4

1. Estimated by STEEL. 2. American Iron Ore Association. 3. Bureau of Mines. 4. Census Bureau.

Ore Stocks Are Ample

Smooth operations this year have filled the deficit brought about by last year's strike. Look for the pressure on lake shippers to let up next year

THE EARLY END to this season's ore shipments on the Great Lakes marks complete recovery from dislocations caused by strikes last year.

This year 84.6 million gross tons of Lake Superior ore were brought down the lakes by the season's end last week. In December last year over 1.5 million tons had to be shipped to bring the 1956 total up to 77.6 million tons.

Early Start—Low ore supplies forced some companies to send their ships out earlier than they would have liked this spring. But stocks were soon built up. By the end of September more Lake Superior ore was on hand at furnaces and Lake Erie docks than in seven of the last nine years.

Pittsburgh Steamship Div., U. S. Steel Corp., hardest hit by last year's strikes, moved 21.7 million tons of ore to lower lake ports this season, over 4 million tons more than its performance last year. As a result, says Adm. Charles R. Khoury, president of the division: "We are in a lot better position than last year."

Next Year — Admiral Khoury says: "We think we'll be kept pretty busy. We hope to have our full fleet in operation." The recent slump in steel production has made other ore carriers less optimistic. One predicts next year's shipments will be down, perhaps 10 per cent. Another says that at the present rate of steel operations, next year's movement could fall even more.

New Ships—Interlake Steamship Co., Cleveland, has two ships under construction. One (its capacity is 24,000 tons) will be ready at the start of next season. The other ship (capacity, about 23,300 tons) will be finished by the spring of 1959. The biggest ship now on the lakes, the *George M. Humphrey,* owned by M. A. Hanna Co., Cleveland, has a capacity of 23,200 tons.

Oglebay Norton Co., Cleveland, has a 20,000-ton ship under construction.

More Ships — Admiral Khoury says Pittsburgh Steamship hopes to replace some of its older ships (45 years and over) with larger and faster lake carriers. Best suited for present-day conditions, says Admiral Khoury, are ships 730 ft long with a 75-ft beam, a capacity of 20,000 to 25,000 tons, and 8500 hp. Estimated cost per ship is $8 million. They will be able to navigate the St. Lawrence Seaway.

Admiral Khoury points out that 12 such ships could replace 29 old vessels now in Pittsburgh Steamship's fleet. He "hopes to have something new operating by 1960."

One roadblock to any general modernization of Great Lakes fleets is the high cost of replacement. Hugh C. Downer, executive vice president, Wilson Marine Transit Co., Cleveland, says that the cost of replacing boats has risen 700 per cent over the last 40 years, while the basic rate of transportation has increased less than 250 per cent.

Pig Iron . . .

Pig Iron Prices, Page 247

Shipments of merchant pig iron continue to drop. A supplier in the Pittsburgh area says demand has not reached the 1954 levels, "but it's headed in that direction."

Foundry activity has declined throughout the fourth quarter and probably will reach new lows during the approaching holiday season. Most jobbing foundries are operating at not more than 32 hours a week; some are as low as 24 hours.

Automotive foundries are running at a better rate than the jobbing shops. Backlogs for castings are at the lowest level recorded in many months, putting foundry operations pretty much on a hand-to-mouth basis. Buying of pig iron parallels operations, since inventories have been whittled down to minimum levels.

Foundries supplying the steel industry report their sales are declining at a faster pace than are steelmaking operations. Of the Chicago district's 43 blast furnaces, only 32 are operating, the lowest since 1954. U. S. Steel Corp. took off its No. 5 stack at the South Works, South Chicago, in late November because its output was not needed.

The smaller of the two blast furnaces at the Central Furnaces &

Docks plant of American Steel & Wire Div., U. S. Steel Corp., Cleveland, was taken out of service Dec. 2. The furnace is rated at 800 tons a day. The curtailment was attributed to reduced requirements for merchant iron by foundries in the territory. No major repair work is contemplated on the D-6 stack while it is down. One battery of coke ovens at the Cleveland Coke & Chemical Works also has been closed down.

Woodward Iron Co., Birmingham, has taken its largest blast furnace out of service for relining. The firm temporarily put into service its smallest stack which had been out of operation for some time. Company officials say another furnace may have to be shut down for repairs in a short time.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 242

Reinforcing bar mills in the Pacific Northwest are operating on reduced schedules. In view of low order backlogs, the holiday interruption may be more extended this year than usual.

Awards of more than 1000 tons of bars for Washington State and Idaho road projects were announced recently. Other highway tonnage is pending. The largest unplaced order for reinforcing bars in the area involves 6300 tons for the Washington State Hood Canal floating bridge.

Steel Bars . . .

Bar Prices, Page 242

Producers of bar mill specialties have built up stocks of billets. They can give shipments on hot and cold drawn materials ahead of normal cycles. The same holds true of carbon bars, with consumers liquidating inventories and holding back new orders.

Current orders are for fill-in requirements on which users request prompt deliveries. The mills not only are meeting shipment requirements, but they are broadening their distribution areas by equalizing on freight.

Volume is off most with non-automotive consumers; cold-drawn tonnage is 30 to 40 per cent under fourth quarter volume of last year. This includes some canceled tonnage by manufacturers and warehouses, notably warehouses.

Cold-drawn bar suppliers in the Pittsburgh area report their customers are paring inventories with demand still slipping. December is likely to be the slowest month for cold drawn this year. Hot-bar sales are said to be about level with November volume.

St. Louis district sellers report production has been at about 50 per cent of capacity the last few weeks. They see no change over the remaining weeks of the year. First quarter orders are few. Automotive demand is perking up on the West Coast.

Expects Sales Increase

Sales of the air conditioning industry this year will total an estimated $3.2 billion, says Cloud Wampler, chairman, Carrier Corp., Syracuse, N. Y. Next year, the total will rise to $3.4 billion, he thinks. It was $2.5 billion only three years ago.

Speaking in San Francisco, Mr.

Wampler said 1957 has not been outstanding from a profit standpoint. Results for the air conditioning industry have been adversely affected by excess capacity, reduced housing starts, tight money, and unfavorable weather in some key markets.

Plates . . .

Plate Prices, Page 242

Emphasizing the continued shortage of wide, heavy plates, a mill in the Pittsburgh district is turning down new orders for January delivery. It rolls heavy plates 72 in. and wider in thicknesses over 1 in.

First quarter order acceptances may be only half as large as they were in the fourth quarter at the mill. The reason: The mill was behind schedule throughout the second half of this year and has a much larger backlog than have some other mills.

Plate buyers will not be unduly inconvenienced in the area. Several eastern mills are actively soliciting orders in the district, and warehouses are sufficiently supplied to care for added demand. In addition, requirements on railroad account, and certain other markets areas, are off.

Except for shipbuilding, demand from leading consuming lines is down in the East. Most district producers are booked through December and are taking January orders, with their backlogs lower.

Contracts for two Washington State ferries, involving 1500 tons of plates, were placed last week with a Seattle fabricator. And 500 tons were placed in the district for the Cougar Dam in Oregon.

Semifinished Steel . . .

Semifinished Prices, Page 242

Above average inventories of semifinished steel at some steel plants are being reflected in steadily declining ingot operations. Producers can give prompt deliveries.

Colorado Fuel & Iron Corp., Denver, is cutting back at its Pueblo mill. Most of its 8400 employees will work 32 hours a week instead of 40. The reduction is due to seasonal slackening in demand for rails and wire.

Two mills of the Tennessee Coal & Iron Div., U. S. Steel Corp., at Birmingham, have been closed down. The cotton tie mill was closed because of reduced demand. The merchant mill was closed for yearend adjustment of inventories.

Another peak year for steel receipts in the seven farwestern states is anticipated, says Kaiser Steel Corp. in a new marketing study. Receipts this year are expected to approach 7 million tons, against 6,840,000 in 1956.

Tubular Goods . . .

Tubular Goods Prices, Page 246

Well drilling is reported to be off almost 10 per cent this year. Suppliers of tubing say users' inventories are high, and sales are dropping at a faster-than-seasonal rate.

Usually, demand picks up after the turn of the year, but large stocks will discourage new buying in the first quarter. Some gain is expected in the second quarter,

along with improvement in butt-weld pipe trade.

This is the offseason for cast iron pipe. Sales agencies expect demand to pick up after Jan. 1 as municipalities begin to anticipate their spring and summer requirements.

U. S. Steel Export Co., subsidiary of U. S. Steel Corp., has reduced export prices on standard seamless pipe. The reductions range from $1 to $4 a ton. They bring export quotations for certain pipe items in line with domestic delivered prices at seaboard. New export price bases, with freight included to New York, Philadelphia, or Baltimore, are:

	New Discount Base (%)	Former Discount Base (%)
Black		
2 in.	+13.65	+14.15
2½ in.	+ 7.15	+ 7.65
3 in.	+ 4.65	+ 5.15
3½ in. & 4 in.	+ 3.15	+ 3.65
5 in.	+ 1.80	+ 3.90
6 in.	− 0.70	+ 1.40
Galvanized		
2 in.	+28.65	+29.15
2½ in.	+23.90	+24.40
3 in.	+21.40	+21.90
3½ in. & 4 in.	+19.90	+20.40
5 in.	+18.55	+20.65
6 in.	+16.05	+18.15

Shipments of finished steel products to the oil and gas industry this year may set a record of nearly 7 million net tons, reports the American Iron & Steel Institute. The total compares with the former record of about 5.6 million tons set in 1956. Shipments include those for oil and gas drilling, oil and gas warehouses, and for construction in the industry.

Among the most important products used in the industry are oil country goods and line pipe used in drilling oil and gas wells. Shipments this year are at a record rate of about 3 million net tons, compared with the former record of less than 2.6 million set during 1956.

The annual rate of line pipe shipments this year is nearly 4.5 million net tons, compared with the former record of about 3.7 million set during 1950. The 16,850 miles of pipeline scheduled for comple-

tion this year will be about 20 per cent more than the 14,100 miles built in 1956, but the total will be short of the record 17,745 miles constructed during 1954.

Wire . . .

Wire Prices, Pages 244 & 245

Manufacturers wire production is holding up at a fairly high level at some points; midwestern mills, for example, report operations at 80 per cent of capacity. Consumers continue to buy hand to mouth.

Little business is coming out for the first quarter; producers do not anticipate much activity in the way of forward booking until late this month.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 243 & 244

While some early first quarter flat-rolled volume is being placed in the East, most of the larger area consuming industries are not anticipating future needs. Automotive and appliance interests have placed limited January orders, but they are not covering for the full first quarter.

Smaller sheet and strip fabricating shops are living off inventories, buying hand to mouth. Some fourth quarter tonnage has been canceled. The mills are without sizable backlogs and can give two to three weeks delivery on the carbon grades of sheets. In some cases, they are still booking orders for December shipment.

Sheet suppliers at Pittsburgh accepted December delivery orders right up to the opening day of the month. They reported demand down in November despite improved automotive volume. Little change in auto requirements is seen over the remainder of this month, and declining demand is in prospect from several miscellaneous consuming areas.

Some Pittsburgh mill interests doubt an upturn in sales will develop in the first quarter. They report little forward buying, and with prompt shipments available, it is thought unlikely that buyers will order far ahead so long as easy supply conditions prevail. Order cancellations by several appliance makers have contributed

noticeably to the oversupply in the Pittsburgh market.

Pretty much the same sluggish conditions prevail at other market centers. Moderately stronger automotive demand is noted at St. Louis, but generally the market is sluggish. Buffalo producers are looking hopefully to a sharp pickup in auto needs in the first quarter. Leadtime on shipments in Los Angeles is reported the shortest in years, with hand-to-mouth ordering the rule.

Except for a mild improvement in demand for 430 grade stainless sheets on automotive account, stainless volume is off. Galvanized sheet volume for December is reported to be the lowest in years.

Structural Shapes . . .

Structural Shape Prices, Page 242

Financing for the proposed 20-story United Exchange Building in Seattle is completed; contract bids for the $11-million structure will be invited soon. Plans provide for 200-car storage. Construction will be steel frame, involving 3500 tons of shapes, and 70-ft precast concrete beams.

Washington State Finance Committee has purchased the $30.5-million bond issue of the Toll Bridge Authority to finance the Hood Canal floating bridge, two automobile ferries, and improvements in the state ferry system.

Demand for fabricated structural steel is declining. Suppliers report November and December tonnage are off more than seasonally. The slackening, in part, reflects the noticeable improvement in supplies, including wide-flange beams which are still not too plentiful.

Most bids in the East, including bridge projects, are under engineers' estimates. Competition for new work has softened prices slightly.

Eastern fabricating shops are shipping tonnage well in excess of bookings — about 455,000 tons heavier in the fourth quarter. The situation is made possible by the increase in supplies.

Bridge work is declining at a time more tonnage should be in process of estimating if federal highway requirements of 1.4 million tons in 1958 are to be reached. In the East, not over 20,000 bridge tons are active, with deliveries extending to midyear.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, window glass plant, Pittsburg Plate Glass Co., near Decatur, Ill., to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

400 tons, research center, Hooker Electrochemical Co., Grand Island, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.; Wigton-Abbott Corp., Plainfield, N. J., general contractor.

250 tons, structurals and bars, high school, Vergennes, Vt., to the Vermont Structural Steel Co., Burlington, Vt.; Swanburg Construction Corp., Manchester, N. H., general contractor.

230 tons, Mercer Island High School, Seattle, to the United Iron Works Inc., Seattle; Dahlgren Construction Co., Seattle, general contractor.

175 tons, East Intermediate School, Haverhill, Mass. (40 tons, structurals) to American Architectural Iron Works, Boston; (75 tons, bar joists) to M. Macomber Inc., Canton, Ohio, and (70 tons, reinforcing bars) to Concrete Steel Co., Boston; Sawyer Construction Co., Burlington, Mass., general contractor.

150 tons, Sand Point School, Seattle, and miscellaneous, to the United Iron Works Inc., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

120 tons, two elementary schools, Norwood, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Leonard Rugo Inc., Boston, general contractor; reinforcing bars, Barker Steel Co., Boston; bar joists, M. Macomber Inc., Canton, Ohio.

100 tons, fire repairs, McChord Air Field hangar, Tacoma, Wash., to unstated fabricator; Roy T. Earley Co., Tacoma, basic general contract at $464,952 from the U. S. Engineer.

STRUCTURAL STEEL PENDING

2100 tons, through plate girder bridge, Muncy Creek-Clinton, Pa.; bids Dec. 20, Harrisburg, Pa.; also, 13,970 linear ft, 20 to 56 ft steel beam piles.

1875 tons, Washington state toll Hood Canal floating bridge; general joint contract awarded to Morrison-Knudsen Co., Puget Sound Bridge & Dredging Co., General Construction Co., Seattle, and Henry J. Kaiser Co., Oakland, Calif.

1000 tons, tower steel, Bethlehem Pacific Coast Steel Corp., Seattle, low at $309,865.

780 tons, Shinnecock Canal bridge, Sunrise Highway extension, Suffolk County, New York; Halloran Construction Co., Providence, R. I., low on general contract.

545 tons, state highway bridges, Interstate Route 505, Jefferson County, New York; Lane Construction Corp., Meriden, Conn., low on general contract.

465 tons, three I-beam bridges, Erie Thruway, Fairview-McKean, Pa.; bids Dec. 20, Harrisburg, Pa.

200 tons, remodeling Washington state ferry terminals; general contract to Larsen Construction Co., Seattle, low at $380,795. and Cotton Engineering & Shipbuilding Co., Port Townsend, Wash., low at $311,577 two jobs.

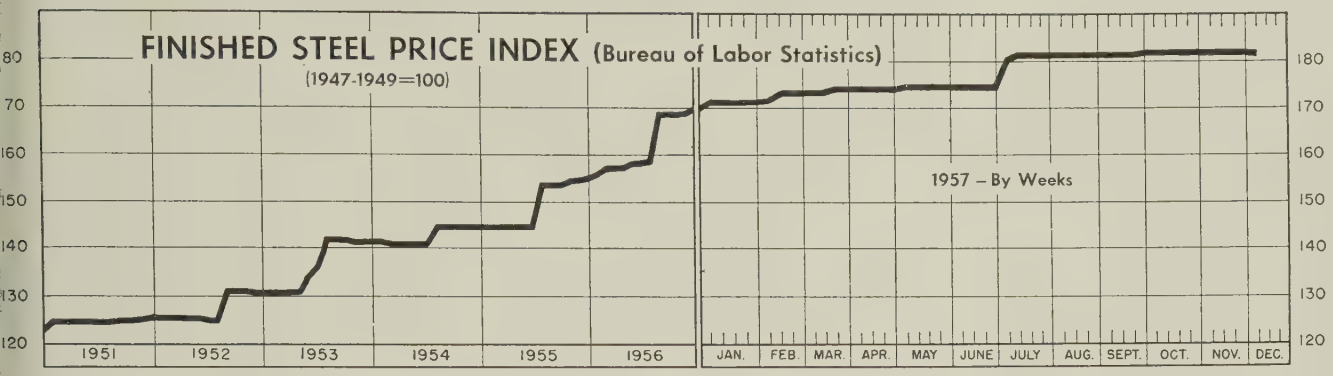
175 tons, loading equipment and grain elevator improvements; bids in to Port of Longview, Wash.; Marshall Barr, Seattle, engineer.

150 tons, Geryhound Terminal, Tacoma, Wash.; bids in.

104 tons, Bureau of Reclamation canal bridge; bids to the Bureau of Reclamation, Ephrata, Wash., Dec. 19.

(*Please turn to Page 252*)

Price Indexes and Composites



Dec. 3 1957	Week Ago	Month Ago	Nov. Avg.	Year Ago
181.7	181.7	181.7	181.7	168.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 3

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1...	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.000
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.535
Bars, Tool Steel, Alloy, Oil Hardening Die (lb) ...	0.650
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.025
Strip, C.R., Carbon	9.243
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	199.023
Casing, Oil Well, Carbon (100 ft)	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft) ..	49.130
Tubing, Mechanical, Carbon (100 ft)	24.953
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)....	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon ...	10.225
Wire, Drawn, Stainless, 430 (lb)	0.653
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common.	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 4 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100) ..	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT.....	$146.03	$146.03	$146.03	$137.66	$110.98
No. 2 Fdry Pig Iron, GT..	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT ...	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT ...	32.33	33.00	33.33	66.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 4 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.35	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh ...	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia..	5.545	5.545	5.545	5.40	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh ...	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh ...	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh ..	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh ...	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts. ...	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton	Dec. 4 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila. .	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.....	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne.	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$31.50	$33.50	$31.50	$66.50	$44.00
No. 1 Heavy Melt, E. Pa. ..	33.50	33.50	35.50	63.00	41.50
No. 1 Heavy Melt, Chicago.	32.00	32.00	33.00	69.00	42.50
No. 1 Heavy Melt, Valley..	29.50	31.50	32.50	66.50	44.00
No. 1 Heavy Melt, Cleve. ..	26.50	28.50	29.50	65.00	43.00
No. 1 Heavy Melt, Buffalo.	32.50	32.50	32.50	60.50	43.00
Rails, Rerolling, Chicago ..	48.00	48.00	48.50	89.00	52.50
No. 1 Cast, Chicago	35.50	35.50	35.50	50.50	50.00

COKE, Net Ton					
Beehive, Furn., Connlsvl. ..	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl. ..	18.25	18.25	18.25	17.50	17.00

Steel Prices

Mill prices as reported to STEEL, Dec. 4, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 243; to footnoes, page 243

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. C32 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. C32 ..101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3 .101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14 .96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. C32 .114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 .....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ...114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 .114.00
Los Angeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 .114.00
S.Duquesne,Pa. U5 ....114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. C32 .$122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ....117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11.6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ...5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14.5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.352
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2.5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 .....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 .....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City, Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown U5, Y1 ...5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 .8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa. (9) J5 ...5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Bridgeport,Conn.(9) C32.5.65
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ..6.175
Fairfield,Ala(9) T2 ..5.425
Fairless,Pa. (9) U5 ..5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston (9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ...5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(23)B11 5.775
Pittsburg,Calif.(9) C11.6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11.6.125
Youngstown(9) R2, U5.5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. C32 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 ....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. C32 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ...7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ...8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ...5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Allo
Aliquippa,Pa. J5 .....6.5
Clairton,Pa. U5 .....6.5
Gary,Ind. U5 .....6.5
Houston S5 .....6.8
KansasCity,Mo. S5 ....6.8
Pittsburgh J5 .....6.5
Youngstown U5 .....6.5

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.92
BeaverFalls,Pa. M12 ..9.92
Camden,N.J. P13 .....10.1
Chicago W18 .....9.92
Cleveland C20 .....9.92
Elyria,O. W8 .....9.92
LosAngeles P2, S30
(Grade A) 11.3
(Grade B) 11.8
Monaca,Pa. S17 .....9.92
Newark,N.J. W18 .....10.1
SpringCity,Pa. K3 .....10.1
Warren,O. C17 .....9.92

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.3
BeaverFalls,Pa. M12,R2 7.3
Birmingham C15 .....7.3
Bridgeport,Conn. C32 ..7.3
Buffalo B5 .....7.3
Camden,N.J. P13 .....7.3
Carnegie,Pa. C12 .....7.3
Chicago W18 .....7.3
Cleveland A7, C20 ....7.3
Detroit B5, P17 .....7.3
Detroit S41 .....7.3
Donora,Pa. A7 .....7.3
Elyria,O. W8 .....7.3
FranklinPark,Ill. N5 ...7.3
Gary,Ind. R2 .....7.3
GreenBay,Wis. F7 .....7.3
Hammond,Ind. J5, L2 ..7.3
Hartford,Conn. R2 .....7.3
Harvey,Ill. B5 .....7.3
LosAngeles (49) S30 ..8.75
LosAngeles P2, R2 ...8.75
Mansfield,Mass. B5 ...7.85
Massillon,O. R2, R8 ....7.3
Midland,Pa. C18 .....7.3
Monaca,Pa. S17 .....7.3
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.3
Pittsburgh J5 .....7.3
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.3
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.3
Warren,O. C17 .....7.3
Willimantic,Conn. J5 ..7.8
Waukegan,Ill. A7 .....7.3
Youngstown F3, Y1 .....7.3

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 .....10.65
LosAngeles S30 .....10.75
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ...8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ..9.075
Youngstown F3, Y1 ..8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 .5.425
Bridgeport,Conn. C32 ..5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ...6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2 .5.425
ChicagoHts.(4) C2 ....5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ...5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19.5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill. (8)G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.,(19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren.O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	..6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 ....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ...6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ...7.425
Niles,O. (28) R2 .....7.425
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	7.00
Gary,Ind. U5	.....7.00
Mansfield,O. E6	.....7.00
Middletown,O. A10	....7.00
Niles,O. M21, S3	.....7.00
Warren,O. R2	.....7.00
Weirton,W.Va. W6	....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel& Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.

O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.925
Allenport,Pa. P7	4.925
Alton,Ill. L1	5.125
Ashland,Ky.(8) A10	4.925
Atlanta A11	5.125
Bessemer,Ala. T2	4.925
Birmingham C15	4.925
Buffalo (27) R2	4.925
Conshohocken,Pa. A3	4.975
Detroit M1	5.025
Ecorse,Mich. G5	5.025
Fairfield,Ala. T2	4.925
Fontana,Calif. K1	5.825
Gary,Ind. U5	4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa. (25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	5.675
Minnequa,Colo. C10	6.025
Pittsburg,Calif. C11	5.675
Riverdale,Ill. A1	4.925
SanFrancisco S7	6.35
Seattle(25) B3	6.35
Seattle N14	6.35
Sharon,Pa. S3	4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill. (1) N15	4.925
Sterling,Ill. N15	5.025
Torrance,Calif. C11	5.675
Warren,O. R2	4.925
Weirton,W.Va. W6	4.925
Youngstown U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.10
Farrell,Pa. S3	8.10
Gary,Ind. U5	8.10
Houston S5	8.35
Ind.Harbor,Ind. Y1	8.10
KansasCity,Mo. S5	8.35
LosAngeles B3	9.30
Lowellville,O. S3	8.10
Newport,Ky. A2	8.10
Sharon,Pa. A2	8.10
S.Chicago,Ill. W14	8.10
Youngstown U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	7.325
Conshohocken,Pa. A3	7.325
Ecorse,Mich. G5	7.425
Fairfield,Ala. T2	7.325
Farrell,Pa. S3	7.325
Gary,Ind. U5	7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	7.325
LosAngeles(25) B3	8.075
Seattle(25) B3	8.325
Sharon,Pa. S3	7.325
S.Chicago,Ill. W14	7.325
S.SanFrancisco(25) B3	8.075
SparrowsPoint,Md. B2	7.325
Warren,O. R2	7.325
Weirton,W.Va. W6	7.325
Youngstown U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.175
Warren,O. R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.15
Baltimore T6	7.15
Boston T6	7.70
Buffalo S40	7.15
Cleveland A7, J5	7.15
Conshohocken,Pa. A3	7.20
Dearborn,Mich. D3	7.25
Detroit D2, M1, P20	7.25
Dover,O. G6	7.15
Ecorse,Mich. G5	7.25
Evanston,Ill. M22	7.25
Follansbee,W.Va. F4	7.15
Fontana,Calif. K1	9.00
FranklinPark,Ill. T6	7.25
Ind.Harbor,Ind. Y1	7.15
Indianapolis J5	7.30
LosAngeles J5	9.05
LosAngeles C1	9.20
NewBedford,Mass. R10	7.60
NewBritain(10) S15	7.15
NewCastle,Pa. B4, E5	7.15
NewHaven,Conn. D2	7.60
NewKensington,Pa. A6	7.15
Pawtucket,R.I. R3	7.80
Pawtucket,R.I. N8	7.70
Philadelphia(45) P24	7.70
Pittsburgh J5	7.15
Riverdale,Ill. A1	7.25
Rome,N.Y. (32) R6	7.15
Sharon,Pa. S3	7.15
Trenton,N.J. (31) R5	8.60
Wallingford,Conn. W2	7.60
Warren,O. R2, T5	7.15
Weirton,W.Va. W6	7.15
Worcester,Mass. A7	7.70
Youngstown J5, Y1	7.15

STRIP, Cold-Rolled Alloy

Boston T6	15.40
Carnegie,Pa. S18	15.05
Cleveland A7	15.05
Dover,O. G6	15.05
Farrell,Pa. S3	15.05
FranklinPark,Ill. T6	15.05
Harrison,N.J. C18	15.05
Indianapolis J5	15.20
Lowellville,O. S3	15.05
Pawtucket,R.I. N8	15.40
Riverdale,Ill. A1	15.05
Sharon,Pa. S3	15.05
Worcester,Mass. A7	15.35
Youngstown J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.45
Dearborn,Mich. D3	10.60
Dover,O. G6	10.45
Ecorse,Mich. G5	10.55
Farrell,Pa. S3	10.50
Ind.Harbor,Ind. Y1	10.65
Sharon,Pa. S3	10.50
Warren,O. R2	10.45
Weirton,W.Va. W6	10.50
Youngstown Y1	10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	7.15*
Dover,O. G6	7.15*
Evanston,Ill. M22	7.25*
Riverdale,Ill. A1	7.25*
Warren,O. B9, T5	7.15*
Worcester,Mass. A7	7.70*
Youngstown J5	7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale,Ill. A1	5.50
Sharon,Pa. S3	5.35
Youngstown U5	5.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
Los Angeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP Coils)	....	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.85
Bartonville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P16	12.65
Muncie,Ind. I-7	12.85
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,A7, J4, T6	9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P7, P16	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE

Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	....16.55
Monessen,Pa. P16	....16.55
Roebling,N.J. R5	....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....11.65
Baltimore T6	.....11.95
Boston T6	.....11.95
Buffalo W12	.....11.65
Chicago W13	.....11.75
Cleveland A7	.....11.65
Crawfordsville,Ind. M8	.11.65
Dover,O. G6	.....11.65
Fostoria,O. S1	.....11.65
FranklinPark,Ill. T6	..11.75
Kokomo,Ind. C16	....11.65
Massillon,O. R8	.....11.65
Milwaukee C23	.....11.85
Monessen,Pa. P7, P16	..11.65
Palmer,Mass. W12	....11.95
Pawtucket,R.I. N8	....11.95
Philadelphia P24	.....11.95
Riverdale,Ill. A1	.....11.75
Rome,N.Y. R6	.....11.65
Sharon,Pa. S3	.....11.65
Trenton,N.J. R5	.....11.95
Warren,O. B9	.....11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	..173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) M8	.184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7 ...$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	...9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	.$10.26
Atlanta A11	.....10.36
Bartonville,Ill. K4	....10.36
Buffalo W12	.....10.26
Chicago W13	.....10.26
Crawfordsville,Ind. M8	.10.36
Donora,Pa. A7	.....10.26
Duluth A7	.....10.26
Fairfield,Ala. T2	....10.26
Houston S5	.....10.51
Jacksonville,Fla. M8	..10.82
Johnstown,Pa. B2	....10.26
Joliet,Ill. A7	.....10.26
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	.....10.36
LosAngeles B3	.....11.05
Minnequa,Colo. C10	...10.51
Pittsburg,Calif. C11	..11.04
S.Chicago,Ill. R2	.....10.26
S.SanFrancisco C10	...11.04
SparrowsPt.,Md. B2	..10.36
Sterling,Ill.(37) N15	..10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	.$10.60
Atlanta A11	.....10.70
Bartonville,Ill. K4	....10.70
Buffalo W12	.....10.60
Chicago W13	.....10.60
Crawfordsville,Ind. M8	.10.70
Donora,Pa. A7	.....10.60
Duluth A7	.....10.60
Fairfield,Ala. T2	.....10.60
Houston S5	.....10.85
Jacksonville,Fla. M8	..11.16
Johnstown,Pa. B2	....10.60
Joliet,Ill. A7	.....10.60
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	....10.70
LosAngeles B3	.....11.40
Minnequa,Colo. C10	..10.85
Pittsburg,Calif. C11	...11.40
S.Chicago,Ill. R2	.....10.60
S.SanFrancisco C10	...11.40
SparrowsPt.,Md. B2	..10.70
Sterling,Ill.(37) N15	..10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	..$10.65
Atlanta A11	.....10.75
Bartonville,Ill. K4	....10.75
Buffalo W12	.....10.65
Chicago W13	.....10.65
Crawfordsville,Ind. M8	.10.75
Donora,Pa. A7	.....10.65
Duluth A7	.....10.65
Fairfield,Ala. T2	.....10.65
Houston S5	.....10.90
Jacksonville,Fla. M8	..11.21
Johnstown,Pa. B2	....10.65
Joliet,Ill. A7	.....10.65
KansasCity,Mo. S5	....10.90
Kokomo,Ind. C16	....10.75
LosAngeles B3	.....11.45
Minnequa,Colo. C10	...10.90
Pittsburg,Calif. C11	...11.45
S.Chicago,Ill. R2	....10.65
S.SanFrancisco C10	...11.45
SparrowsPt.,Md. B2	...10.75
Sterling,Ill.(37) N15	..10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	..212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	...219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	...175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	..172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	..171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	..174

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	...203
Johnstown,Pa. B2	....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	...198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	...198**
Monessen,Pa. P7	.....196*
Pittsburg,Calif. C11	...213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	..213**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	....198§

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	....187**
Aliq'ppa,Pa.9-14½ga. J5	190§
Atlanta A11	.....192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	...197
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	...192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	...210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	...17.40	18.95**
Jacksonville M8	.17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	.17.50	19.05†
SparrowsPt. B2	.17.25	19.05§
Sterling(37)N15	.17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality (6 to 8 gage) — **An'ld Galv.**

Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	....8.65 9.20†
Cleveland A7	....8.65 ....
Crawfordsville M8	8.75 9.425
Donora,Pa. A7	..8.65 9.20†
Duluth A7	.....8.65 9.20†
Fairfield T2	.....8.65 9.20†
Houston(48) S5	.8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	....8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	.....8.75 9.30†
LosAngeles B3	..9.60 10.275§
Minnequa C10	..8.90 9.45**
Monessen P7(48)	..8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	..9.60 10.15†
Rankin,Pa. A7	..8.65 9.20†
S.Chicago R2	...8.65 9.20**
S.SanFran. C10	..9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	.8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struthers,O.(48)Y1	8.65 9.30‡
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter....	49.0
Longer than 6 in. ..	39.0
⅝ in. thru 1 in.:	
6 in. and shorter...	39.0
Longer than 6 in. ..	35.0
1⅛ in. and larger:	
All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter..	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter..	29.0
Longer than 6 in. ..	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter..	49.0
Longer than 6 in. ..	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in. ..	39.0
Blank Bolts	39.0
Step, Elevator, Tire Bolts	49.0

Stove Bolts, Slotted:

⅛ to ¼ in. incl., 3 in. and shorter.	55.0
⅝ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts: All sizes	55.5
Square Nuts, Reg. & Heavy, Hot Galvanized: All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller..	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger..	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller..	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller..	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller..	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller..	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller..	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller..	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller..	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller..	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller..	+13.0
¾, ⅞, and 1 in. diam.	+32.0
Flat Head Capscrews: ¾ in. and smaller..	+76.0
Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam.:	
6 in. and shorter...	Net
Longer than 6 in...	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25

⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor,Ind. I-2	....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	....6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75

JOINT BARS

Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor,Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa, Colo. C10	..6.975
Steelton,Pa. B2	.....6.975

AXLES

Ind.Harbor,Ind. S13	...8.775
Johnstown, Pa. B2	....8.775

TRACK BOLTS, Untreated

Cleveland R2	.....14.75
KansasCity,Mo. S5	....14.75
Lebanon,Pa. B2	.....14.75
Minnequa,Colo. C10	...14.75
Pittsburgh P14	.....14.75
Seattle B3	.....15.25

SCREW SPIKES

Lebanon,Pa. B2 .....14.50

STANDARD TRACK SPIKES

Fairfield, Ala. T2	.....9.75
Ind.Harbor,Ind. I-2, Y1	.9.75
KansasCity,Mo. S5	...9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....9.75
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(21) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c. finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c. for widths ⅝ in. and under by 0.125 in. and thinner
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co., Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	..	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00••	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

••Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight alowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents: Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	55.68	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.06	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	7.85	10.75	11.65	57.60	7.90	7.90	12.10	....	7.95	7.90	10.05
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51#	15.01	8.50	8.77	9.77••
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.65#	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

•Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; ••⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb. except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [6]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Oliver Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfied, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Phiadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over F.o.b. Riverton, N. J., west of Mississippi River	10.50 9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500 lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.28	$6.23	$6.23	$6.48
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C. R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82 lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season gross ton, 51.50% iron natural, rail of vessel lower lake ports.)

Mesabi bessemer	$11.6
Mesabi nonbessemer	11.4
Old Range bessemer	11.8
Old Range nonbessemer	11.7
Open-hearth lump	12.7
High phos.	11.4

The foregoing prices are based on upper lak rail freight rates, lake vessel freight rates handling and unloading charges, and taxe thereon, which were in effect Jan. 30, 1957 and increases or decreases after that date ar absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.00-14.00*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.39-1.42 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nomnial; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-30.50

Turkish

48% 3:1	$55.00-57.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind. ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered, Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk. C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk. 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained. f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

(*Concluded from Page 240*)

100 tons or more, high school, Moses Lake, Wash., $1.35 million project; bids Dec. 10.

100 tons, fish gate hoists and equipment; Monarch Forge & Machinery Co., Portland, Oreg., low at $33,665 to Portland General Electric Co.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, remodeling of four Washington state ferries, to Pacific Car & Foundry Co., Seattle, awarded at $1,407,514.

455 tons, Ballard Bridge underpass, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; S. S. Mullen Inc., Seattle, general contractor, low at $815,636.

400 tons, Yellowstone River Bridge, Idaho, to unstated interest; Cahoon Construction Co., general contractor.

290 tons, fishway, Baker River, Wash., power project for Puget Sound Power & Light Co., to Bethlehem Pacific Coast Steel Corp., Seattle.

260 tons, state office building, Cheyenne, Wyo., to the Ceco Steel Products Inc., Omaha, Nebr.; Spiegelberg Construction Co., Laramie, Wyo., general contractor; 65 tons, fabricated structural steel, to the Omaha Steel Works, Omaha, Nebr.

225 tons, graduate dormitory, Yale University, New Haven, Conn., to the Fox Steel Co., Orange, Conn.; E.&F. Construction Co., Bridgeport, Conn., is general contractor.

200 tons, Idaho, State road projects, to the Allen Steel Supply Co., Boise, Idaho; S. S. Mullen Inc., Seattle, general contractor.

175 tons, Catholic Church, Bellevue, Wash., to the Northwest Steel Rolling Mills Inc., Seattle; Cawdrey & Vemo, Seattle, general contractor.

156 tons, Washington state highway project, Moses Lake, to Bethlehem Pacific Coast Steel Corp., Seattle; McClay Construction Co., Vancouver, B. C., general contractor, low at $212,471.

150 tons, research center, Hooker Electro-Chemical Corp., Grand Island, N. Y., to the Bethlehem Steel Co., Bethlehem, Pa.; Wigton-Abbott Corp., Plainfield, N. J., general contractor.

100 tons, two ferry units for State of Washington, costing $4,288,000, to Puget Sound Bridge & Dredging Co., Seattle.

72 tons, involved in concrete piling, Washington state highway project, Moses Lake, awarded to unstated interest.

REINFORCING BARS PENDING

675 tons, including 500 tons of welded mesh, reinforced concrete pavement and highway structures, Erie Thruway, Springfield Township, Pa.; bids Dec. 20, Harrisburg, Pa.; also lump sum bids on four bridge superstructures.

415 tons, including 300 tons of welded mesh, reinforced concrete pavement and three I-beam bridges, Erie Thruway, Fairview-McKean townships, Pennsylvania; bids Dec. 20, Harrisburg, Pa.

370 tons, state highway bridges, including through plate girder, Muncy Creek-Clinton, Pa.; bids Dec. 20, Harrisburg, Pa.

180 tons, Washington State highway project, Whatcom County; general contract to Fiorito Bros., Seattle, low at $596,526.

165 tons, terminal chute, canal project, Columbia Basin; bids to the Bureau of Reclamation, Ephrata, Wash., Dec. 19.

156 tons, Washington State, three bridges, Grant County; general contract to the McClay Construction Co., Vancouver, B. C., low at $212,471.

140 tons, Enquatsel Diversion Canal; bids to the Bureau of Reclamation, Ephrata, Wash., Dec. 19.

PLATES . . .

PLATES PLACED

1500 tons, two Washington state ferries; general contract to Puget Sound Bridge & Dredging Co., Seattle.

500 tons, Cougar Dam, U. S. Engineer project, Oregon, to unstated interest.

100 tons plus, storage tank for Water District No. 75, Seattle, to the Chicago Bridge & Iron Co., Seattle.

100 tons or more, 1600 ft of 48-in. steel pipe, system expansion, Everett, Wash., to the Beall Pipe & Tank Corp., Portland, Oreg., at $45,453.

PLATES PENDING

100 tons or more, 1842 feet of 36-in. steel water pipe, S. E. 145th Avenue project; bids to Portland, Oreg., Dec. 9; alternative tenders for reinforced concrete pipe.

PIPE . . .

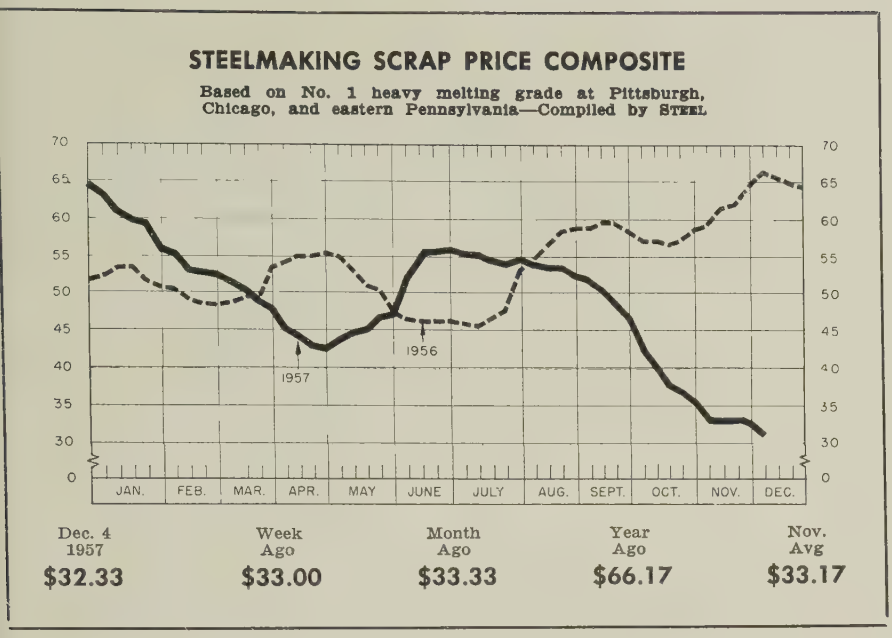
CAST IRON PIPE PENDING

200 tons, class 150, 8 to 4 in.; bids to Alderwood Water District No. 69, Seattle, Dec. 9.

Rails, Cars . . .

Track Material Prices, Page 245

Transcontinental railroads, which usually award annual contracts to Pacific Coast fabricators for track materials, have not indicated what their 1958 programs will be. No awards have been made locally for the coming season, but some business for the near future is indicated. The nut and bolt plant of Bethlehem's Seattle operations is operating at about 75 per cent of capacity.



Scrap Lowest Since October, 1954

STEEL's composite on the prime steelmaking grade declines another 67 cents to $32.33. Steel mills disinterested in winter stockpiling as ingot operations still slide

Scrap Prices, Page 256

Philadelphia—Open-hearth scrap prices appear to be nearing bottom, with most grades holding unchanged for the third straight week. Tonnage is not coming out at current low quotations, although new buying is light. Sales of No. 1 cupola cast were made last week at $38, and heavy breakable at $37, both grades being off $1 a ton.

The Pennsylvania Railroad closes Dec. 10 on 18,810 tons of scrap, including 4550 tons of No. 1 heavy melting and 3700 tons of rerolling rails.

New York—Steel scrap buying is thin, with prices for the most part unchanged for the second successive week. The movement of borings and turnings is notably slow at nominal brokers' prices. Stainless scrap, 430 and 410 grades, is slightly firmer.

Chicago — Scrap prices are steady, but it's principally because the market isn't being tested seriously. Plenty of steelmaking scrap is available, but with a declining steelmaking rate and substantial inventories in mill yards, consumers are buying sparingly, gradewise and tonnagewise.

District steelmaking operations at 74.5 per cent of capacity are now the lowest, except for steel strike periods, since the week ended Oct. 10, 1954, when the rate was the same. Only 32 of the district's 43 blast furnaces are in production, also the lowest point since October, 1954.

Detroit—Prices are steady here in the absence of new orders. Brokers and dealers say yards are as full as ever. No further demand is seen in this area. Great Lakes Steel Corp. is sending out coil ends for rebaling for use next month.

Buffalo—With steel mill operations declining, the mills are going easy on scrap purchases. As a result, scrap prices are tending downward. Dealers report slow movement of material to their yards, especially from small collectors.

Cincinnati—A small order placed last week by an area steelmaker is providing some support to the weak scrap market. But prices are expected to dip further with the district steel ingot rate still tending downward.

St. Louis—Heavy melting and railroad steel scrap prices dropped $1 to $2 a ton last week, with mills showing little interest in winter stockpiling. Consumers' ground stocks are substantial in the face of declining steel ingot production.

Pittsburgh — Most scrap prices fell last week, as industrial bundles and railroad scrap lists were weak. No. 1 factory bundles sold at $3 a ton below most recent quotations. Railroad grades were off $1 to $4. A mill on the fringe of the Pittsburgh area bought No. 1 heavy melting for a price equivalent to $32, off $2. With demand for other grades continuing low, prices generally dropped $2 a ton. No. 2 bundles are $29, a reduction of $1.

Cleveland — Prices are off another couple dollars a ton, but quotations on dealer scrap are nominal in the absence of sales. Limited mill buying of industrial grades has been done recently. Three mills in the Valley bought No. 1 factory bundles, paying up to $35. Otherwise, the market has been inactive. Foundry demand is sluggish, and quoted prices on the cast grades are nominal.

Birmingham — Scrap continues inactive. Open-hearth grade consumers continue out of the market. Most electric furnaces are either out of the market or buying sparingly. Some railroad items are quoted slightly lower. Most cast iron prices are unchanged, but unstripped motor blocks are up $2 a ton. The export market is at a standstill.

Los Angeles—With district mill operations down, scrap buying has halted. Dealers' yards are overstocked.

Seattle — The scrap market is dormant here. Yards are inactive and dealers are marking time. Receipts are less due to slack demand,

(*Please turn to Page* 261)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Dec. 4, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 4	$32.33
Nov. 27	33.00
Nov. Avg.	33.17
Dec. 1956	64.29
Dec. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 factory bundles	*33.00-34.00*
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals:	
2 ft and under	*35.00-36.00*
3 ft lengths	*34.00-35.00*
Heavy turnings	30.00-31.00
Punchings & plate scrap	*34.00-35.00*
Electric furnace bundles	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Stove plate	*33.00-34.00*
Unstripped motor blocks	*26.00-27.00*
Clean auto cast	*42.00-43.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt	*35.00-36.00*
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	*46.00-47.00*
Rails, rerolling	*53.00-54.00*

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 factory bundles	*29.00-30.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	19.00-20.00
No. 1 busheling	*26.00-27.00*
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	33.00-34.00
Cut structurals, plates 2 ft and under	35.00-36.00
Low phos. punchings & plate	29.00-30.00
Alloy free, short shovel turnings	*19.00-20.00*
Electric furnace bundles	*27.00-28.00*

Cast Iron Grades*

No. 1 cupola	38.00-39.00
Charging box cast	33.00-34.00
Heavy breakable cast	29.00-30.00
Stove plate	36.00-37.00
Unstripped motor blocks	23.00-24.00
Brake shoes	30.00-31.00
Clean auto cast	*42.00-43.00*
Burnt cast	28.00-29.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt	*31.50-32.50*
R.R. malleable	49.00-50.00
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Rails, random lengths	48.00-49.00
Cast steel	43.00-44.00
Railroad specialties	*43.00-44.00*
Uncut tires	*37.00-38.00*
Angles, splice bars	*43.00-44.00*
Rails, rerolling	54.00-55.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

*Nominal

YOUNGSTOWN

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt	*34.50-35.50*

CHICAGO

No. 1 heavy melt., indus.	33.00-34.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	*19.00-20.00*
No. 1 busheling, indus.	33.00-34.00
No. 1 busheling dealer	30.00-31.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3 ft.	38.00-39.00
Punchings & plate scrap	39.00-40.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	33.00-34.00
Unstripped motor blocks	27.00-28.00
Clean auto cast	39.00-40.00
Drop broken machinery	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	*44.00-45.00*
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and smaller	49.00-50.00
Angles, splice bars	46.00-47.00
Axles	48.00-49.00
Rails, rerolling	47.00-49.00

Stainless Steel Scrap

18-8 bundles & solids	205.00-215.00
18-8 turnings	105.00-115.00
430 turnings & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	21.00-22.00
No. 2 heavy melting	18.00-19.00
No. 1 bundles	23.00-24.00
No. 2 bundles	18.00-19.00
No. 1 busheling	21.00-22.00
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Short shovel turnings	10.00-11.00
Punchings & plate scrap	27.00-28.00

Cast Iron Grades

No. 1 cupola	31.00
Stove plate	25.00
Charging box cast	25.00
Heavy breakable	24.00
Unstripped motor blocks	15.00†
Clean auto cast	33.00
Malleable	34.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*35.00*
No. 2 bundles	*25.00*
No. 1 busheling	*35.00*
Machine shop turnings	*15.00*
Short shovel turnings	*17.00*

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	43.00
Stove plate	*37.00*

Railroad Scrap

No. 1 R.R. heavy melt.	36.25
Rails, 18 in. and under	*49.00*
Rails, random lengths	*43.00*
Rails, rerolling	*47.00*
Angles splice bars	*43.00†*

†Nominal

PHILADELPHIA

No. 1 heavy melting	33.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	24.50
No. 1 busheling	34.50
Electric furnace bundles	37.00
Mixed borings, turnings	22.50
Short shovel turnings	24.00
Machine shop turnings	22.00†
Heavy turnings	*29.50*
Structurals & plate	42.00-43.00
Couplers, springs, wheels	46.00
Malleable	57.00
Rail crops, 2 ft & under	63.00-65.00

Cast Iron Grades

No. 1 cupola	*38.00*
Heavy breakable cast	*37.00*
Malleable	57.00
Drop broken machinery	50.00-51.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	33.50
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.50
No. 2 bundles	21.00-22.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Low phos. (structurals & plate)	45.00-46.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	32.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	160.00-165.00
18-8 borings, turnings	55.00-60.00
410 sheets, clips, solids	*60.00-65.00*
430 sheets, clips, solids	*70.00-75.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	23.00-24.00
No. 2 bundles	*15.00-16.00*
No. 1 busheling	23.00-24.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	32.00-33.00
No. 2 bundles	27.00-28.00
No. 1 busheling	32.00-33.00
Mixed borings, turnings	18.00-19.00
Machine shop turnings	16.00-17.00
Short shovel turnings	20.00-21.00
Cast iron borings	18.00-19.00
Low phos.	37.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	37.00-38.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos. 18 in.	36.00-37.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	*33.00-34.00*
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	*43.00-44.00*

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	15.00-16.00
Short shovel turnings	21.00-22.00
Machine shop turnings	20.00-21.00
Bar crops and plates	38.00-39.00
Structurals & plate	38.00-39.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	47.00-48.00
Unstripped motor blocks	*37.00-38.00*
Charging box cast	22.00-23.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	*46.00-47.00*
Rails, rerolling	*47.00-48.00*
Rails, random lengths	*40.00-41.00*
Angles, splice bars	40.00-41.00

SEATTLE

No. 1 heavy melting	34.00†
No. 2 heavy meltng	32.00†
No. 1 bundles	33.00†
No. 2 bundles	25.00†
Machine shop turnings	26.00†
Mixed borings, turnings	26.00†
Electric furnace No. 1	46.00

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant)	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	30.00
Machine shop turnings	20.00
Shoveling turnings	25.00
Cast iron borings	25.00
Cut structurals and plate 1 ft and under	54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	26.00
Machine shop turnings	20.00
Mixed borings, turnings	20.00
Cast iron borings	20.00
Heavy turnings	20.00
Short shovel turnings	20.00
Cut structurals, 3 ft	48.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Stove plate	39.00
Heavy breakable cast	38.00
Unstripped motor blocks	36.00
Clean auto cast	47.00
No. 1 wheels	40.00
Drop broken machinery	47.00

HAMILTON, ONT.

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*34.00*
No. 2 bundles	*24.00*
Mixed steel scrap	*29.00*
Mixed borings, turnings	*19.00*
Busheling, new factory:	
Prepared	*34.00*
Unprepared	*28.00*
Short steel turnings	*23.00*
Rails, rerolling	*42.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

Lead Tumbles to 13 Cents

Half-cent cut marks second time prices have fallen in two months. Position of copper remains precarious. Zinc will probably hold. Foreign quotations stay down

Nonferrous Metal Prices, Pages 260 & 261

CONTINUED WEAKNESSES in the lead market have dropped the primary price another half cent. Leading producers announced the cut to 13 cents a pound (New York) on Dec. 2. It marks the second time in less than two months that lead has tumbled. (It fell from 14 to 13.5 cents a pound on Oct. 14.)

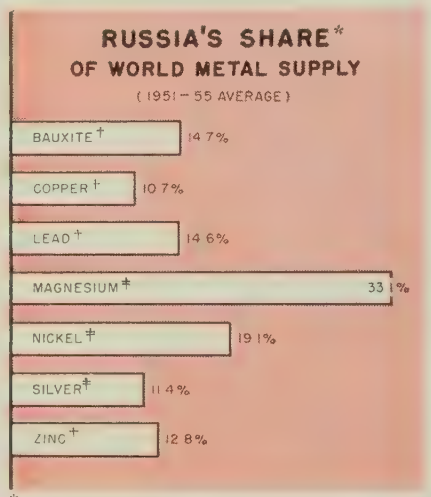
Whatever momentum the lead market had, started to wane in the fourth quarter. Recent buying has been even more sluggish than it was in some of the summer months. At the same time, production has risen, with the resultant buildup in producers' stocks. Statistics reveal the domestic output of refined lead in October hit 52,041 tons, a 1605-ton jump over the September figure and the highest month since April. But October shipments (40,447 tons) fell 11,412 tons below September's and were the lowest since July. Unsold stocks climbed to 59,041 tons.

Complicating the domestic picture is the softness on the London Metal Exchange. Before the Dec. 2 drop, it was possible to buy foreign origin lead in the U. S. at about 2 cents a pound under the domestic price. Even now, there is a gap of about 1.25 cents a pound between foreign lead delivered in New York and the U. S. price.

This leads some observers to believe that the price may again be chopped. But other metalmen think the industry will be reluctant to do so. They see the present price holding at least until the first of the year.

One thing seems certain: The latest fluctuation will add weight to the arguments of those industry people favoring a hike in lead and zinc tariffs.

Zinc—Whenever lead falls, one of the big questions is whether zinc will follow suit. This time most metalmen believe zinc will not be affected. Their reason: The spread between the LME and U. S. prices is not great enough to seriously affect domestic producers' business.



*Includes satellites
†Ore production. ‡Refined production.
Source: Canadian Department of Mines & Technical Surveys.

Sales still plod along at only fair levels. Shipments to diecasters continue good, but brass mill and galvanizing sales are mediocre.

Copper—Custom smelters report mixed reactions to the Nov. 21 cut of one-half cent a pound. Some say sales are better; others say there is less interest than ever.

Primary copper's price position still remains hazardous. At 27 cents, it's 2 cents a pound under custom smelted. There are doubts this differential can be maintained. The possibility that custom smelters could drop their price again makes primary's position even more doubtful. Added woes are the continued weakness on the LME and the cut in Katanga copper to 23.15 cents a pound c.i.f., New York.

U. S. vs. Russian Metals

The U. S. and its allies continue to maintain a substantial lead over Iron Curtain countries in the production of nonferrous ores and metals (see chart for Russia's share).

Examples: During 1955, Russia and her satellites produced 365,000 tons of primary aluminum, compared with 2.8 million tons for the Free World. Smelter output of copper in 1955 was 372,500 tons in the Soviet Union, 3.3 million tons in the Free World. During the same year, slab zinc production in Iron Curtain countries was 442,000 tons, in the Free World 2.5 million tons.

Two Tariff Reliefs

The growing reluctance of Congress to establish a support program for the domestic nonferrous industry and the slowdown in barter and stockpile have turned producers' eyes to the Tariff Commission as a source of relief.

The commission can generally

NONFERROUS PRICE RECORD

	Price Dec. 4	Last Change	Previous Price	Nov. Avg	Oct. Avg	Dec., 1956 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	25.00–27.00	Nov. 21, 1957	25.50-27.00	26.217	26.361	35.650
Lead	12.80	Dec. 2, 1957	13.30	13.300	13.504	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	91.50	Dec. 4, 1957	90.375	89.288	91.843	105.067
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

recommend relief under one of two Congressional acts: 1. The escape clause provision in trade agreement acts. 2. Section 336 of the Tariff Act of 1930.

The recent lead and zinc hearings point up a current example of an industry petitioning for relief under the escape clause provision. In essence, the escape clause is a built-in contract in U. S. trade agreement acts: Either party may withdraw or modify any part of an act if imports reach the point where they cause or threaten serious injury to a domestic industry. The escape clauses have had an "on again, off again" history since 1943, but in 1951 Congress made it mandatory that they be inserted into all U. S. trade agreements. The escape clause is the only method of relief through the Tariff Commission on any item that comes under one of the trade agreement acts.

When a metal does not fall under the trade agreement acts, relief may be sought under Section 336 of the Tariff Act of 1930. Under this provision, the President has the power to raise or lower the existing duty by as much as 50 per cent upon recommendation of the commission.

The current study of tungsten duties by the commission is such an investigation. Here's what could happen: The duty on tungsten imports is now 50 cents a pound. Upon recommendation of the commission, the President could raise it to 75 cents. Technically, he could lower it to 25 cents a pound, or set a new duty at anywhere in these ranges. But in recent years the trend has been to raise tariffs.

Aluminum Notes

- Aluminum Co. of America has installed a new research facility in its Chicago works to study die-casting processes.
- Kaiser Aluminum & Chemical Co. says it is producing drawn aluminum furniture tubing with a bright finish at its Halethorpe, Md., extrusion plant.
- Shipments of aluminum sheets and plates rose to 52,627 tons in October from September's 48,027 tons. Foil shipments increased from 7700 to 8619 tons.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $80-110 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 90.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 91.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-25.50; No. 12 foundry alloy (No. 2 grade), 21.75-23.25; 5% silicon alloy, 0.60 Cu max., 25.50-26.25; 13 alloy, 0.60 Cu max., 25.50-26.25; 195 alloy, 24.75-27.00; 108 alloy, 22.25-23.25. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.13b	47.36c	....	50.32	23.000	23.000	22.250
Yellow Brass	44.02	32.30d	44.56	46.93	17.375	17.125	15.750
Low Brass, 80%	46.50	46.44	47.04	49.31	19.500	19.250	18.750
Red Brass, 85%	47.37	47.31	47.91	50.18	20.250	20.000	19.500
Com. Bronze, 90%	48.78	48.72	49.32	51.34	21.000	20.750	20.000
Manganese Bronze	52.01	46.11	56.61	....	16.125	15.875	15.375
Muntz Metal	46.39	42.20	....	....	16.375	16.125	15.625
Naval Brass	48.27	42.58	55.33	51.68	16.125	15.875	15.375
Silicon Bronze	54.76	53.95	54.80	56.74e	22.625	22.375	21.625
Nickel Silver, 10%	60.43	62.75	62.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.75-19.25; No. 2 heavy copper and wire, 16.75-17.25; light copper, 14.50-15.00; No. 1 composition red brass, 15.50-16.00; No. 1 composition turnings, 15.00-15.50; new brass clippings, 13.00-13.50; light brass, 9.50-10.00; heavy yellow brass, 11.00-11.50; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 12.50-13.00; brass pipe, 12.50-13.00.

Lead: Heavy, 8.50-9.00; battery plates, 4.00-4.25; linotype and stereotype, 10.25-10.75; electrotype, 9.25-9.75; mixed babbitt, 10.50-11.00.

Monel: Clippings, 30.00-32.00; old sheets, 29.00-30.00; turnings, 23.00-24.00; rods 30.00-32.00.

Nickel: Sheets and clips, 42.00-47.00; rolled anodes, 42.00-47.00; turnings, 40.00-42.00; rod ends, 42.00-47.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.50; light copper, 17.25; refinery brass (60% copper) per dry copper content, 19.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.50; light copper, 17.25; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.25; yellow brass turnings, 12.25; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb. 108.50; ;200-499 lb, 107.00; 500-999 lb, 106.50; 1000 lb or more, 106.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats. 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb. 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 73.20; 100-600 lb, 64.20; 700-1900 lb, 61.50; 200-9900 lb, 59.60; 10,000 lb or more, 58.30.

Stannous Chloride (anhydrous): Less than 25 lb, 162.20; 25 lb, 127.20; 100 lb, 112.20; 400 lb, 109.80; 5200-19,600 lb, 97.60; 20,000 lb or more, 85.40.

Stannous Sulphate: Less than 50 lb, 125.20; 50 lb, 95.20; 100-1900 lb, 93.20; 2000 lb or more, 91.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 255*)

low prices, and unfavorable weather in the interior. Prices are nominal. Sales the last 60 days have been insufficient to establish firm levels.

Warehouse . . .

Warehouse Prices, Page 247

Distributors in the Los Angeles area have reduced prices sharply, reflecting a decline in demand in a highly competitive market. Inventories are high, and fourth-quarter business is expected to drop well below earlier expectations.

Warehouse executives on the West Coast point out that conditions are better than they were during the 1954 business lull and are on a par with 1955-56. This opinion is based in part on the fact that their customers' inventories are lower, indicating that any pickup in industrial activity will require proportionately heavier ordering of steel products.

In the midwest district, warehouse sales are 20 to 30 per cent below the corresponding period a year ago. The approaching holidays will cause a drop in bookings from the November rate. Most distributors in this area are reducing their inventories somewhat, and this is reflected in shipments from mills. Specialty warehouses appear to be enjoying a better business volume than the general stores.

Suppliers of plate in the Pittsburgh area report moderate spurts in sales, owing to continued shortages of heavy sheared plates. They have rounded out their supplies of plates and structurals and can fill requests for immediate delivery of almost all products.

CLASSIFIED

Help Wanted

CLEANING ROOM SUPERINTENDENT: Must have supervisory experience and be completely familiar with all phases of cleaning room operations for a miscellaneous steel jobbing foundry producing castings up to 10,000 pounds. Excellent opportunity for an aggressive qualified man with a modern and progressive foundry located in the Middle West producing 600-700 tons per month. Advise full particulars including salary requirements. Box 603, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL MILL SUPERINTENDENT for small plant consisting of electric furnace and Merchant Mill. Must have experience all phases. Southern location. Give complete account of experience, references and salary anticipated. Write Box 624, STEEL, Penton Bldg., Cleveland 13, Ohio.

Advertising Index